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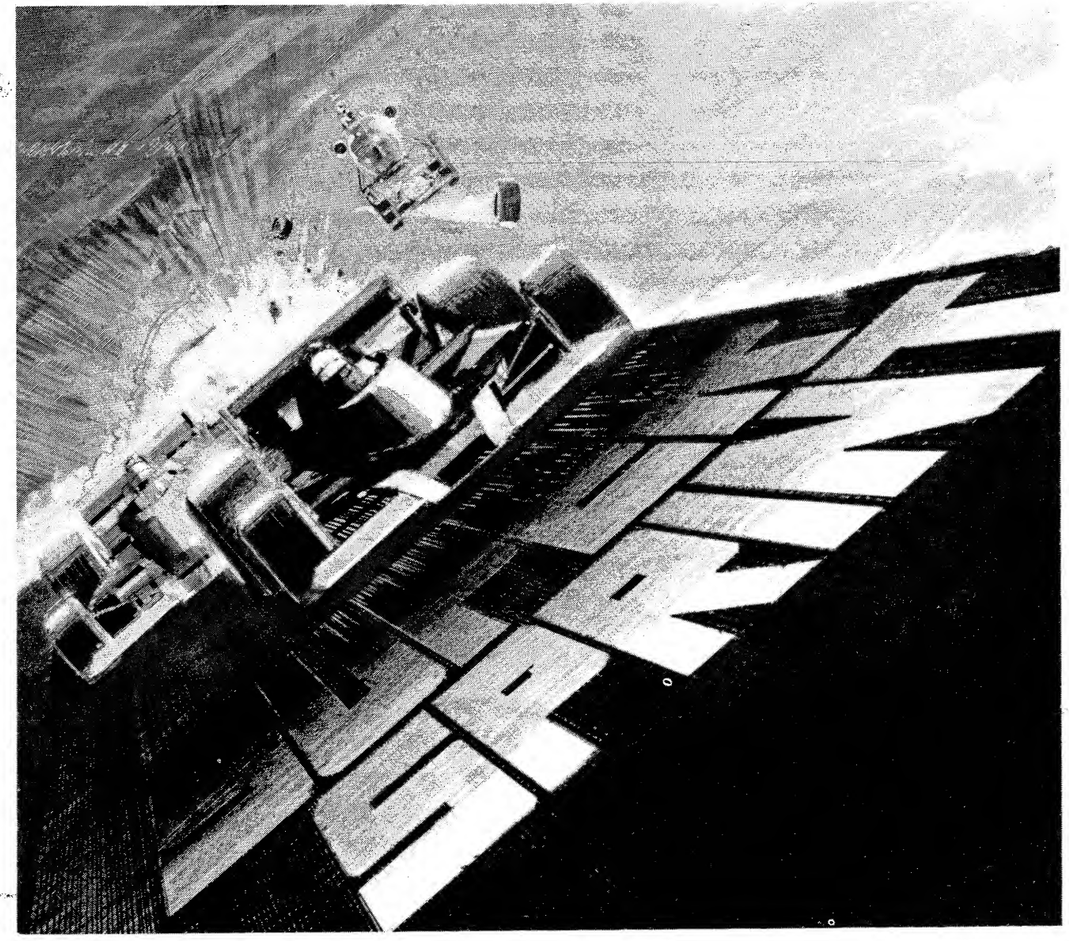

NOTE
This staple temporarily holds the schematic package together. Remove the staple before using these schematics.

Schematic Package Supplement to the Super Sprint™ Operators Manual

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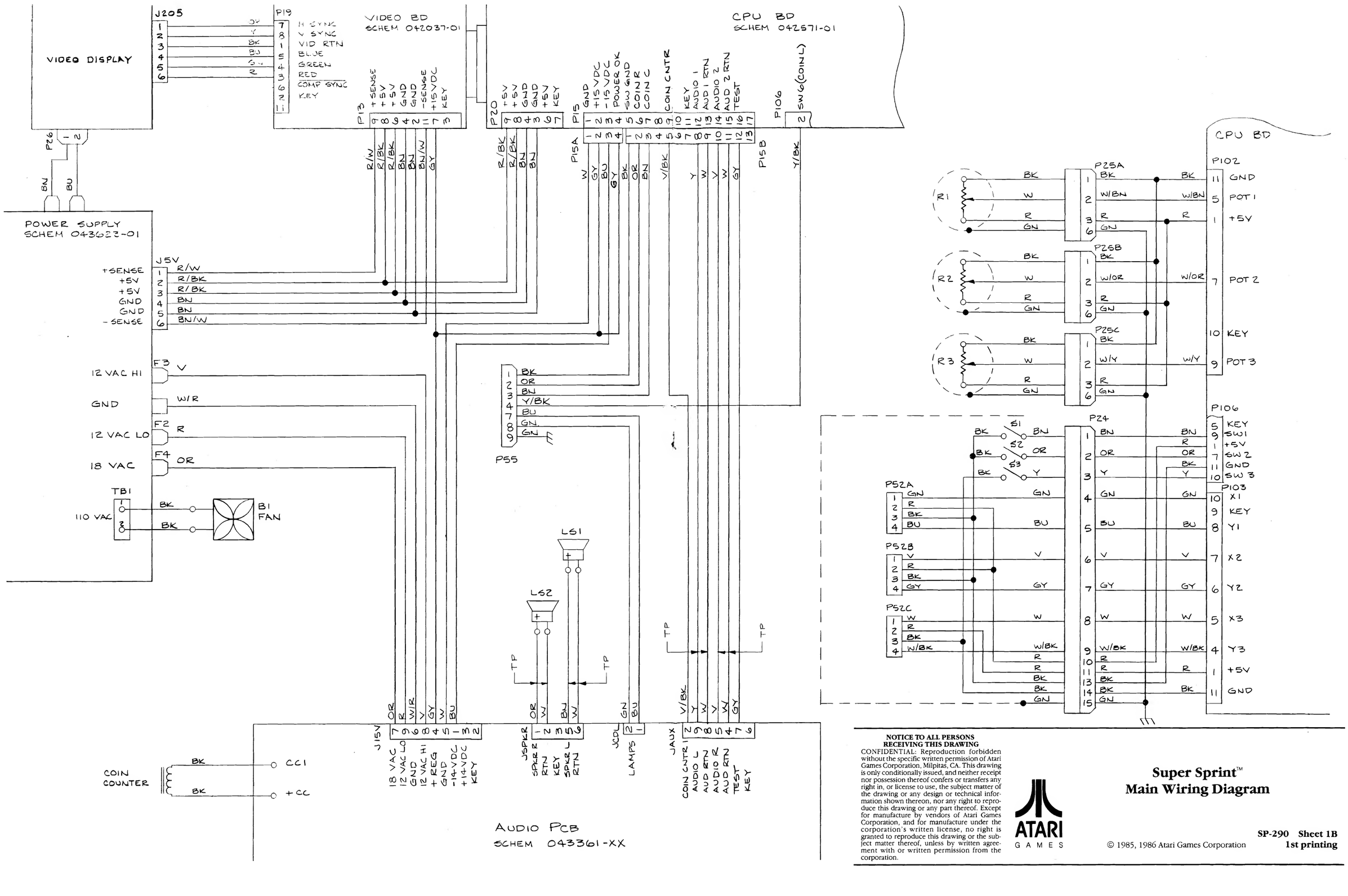

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Super Sprint™ Main Wiring Diagram

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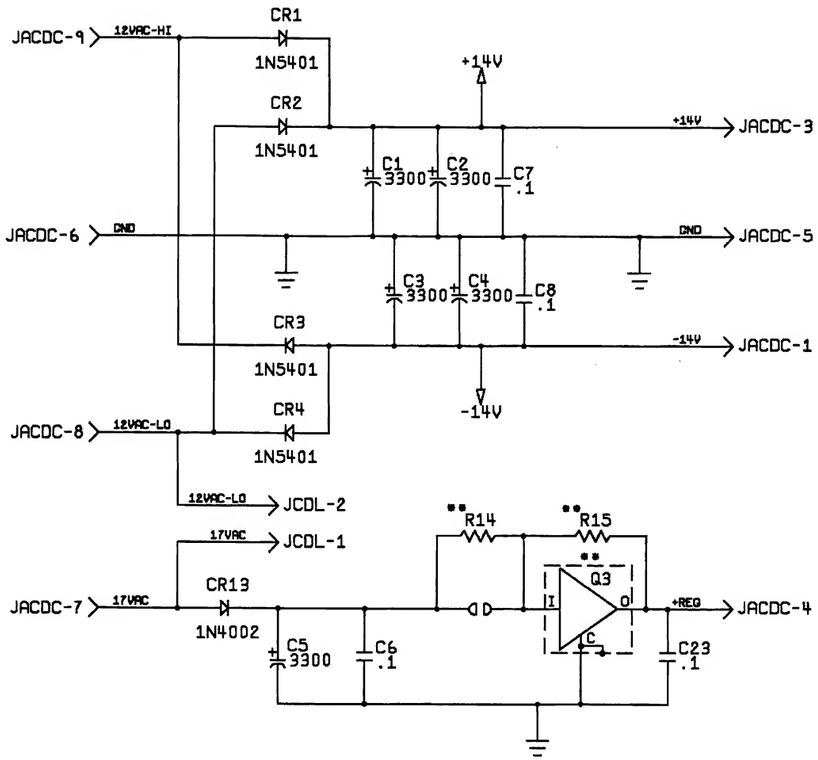

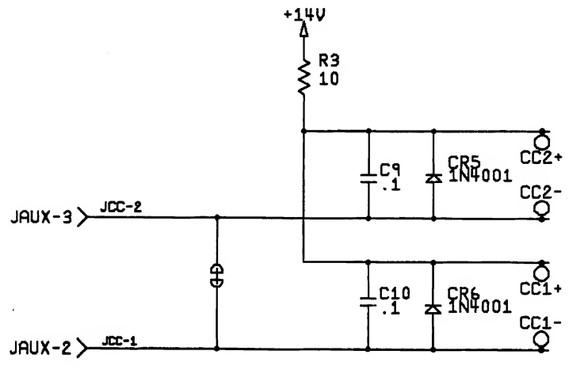

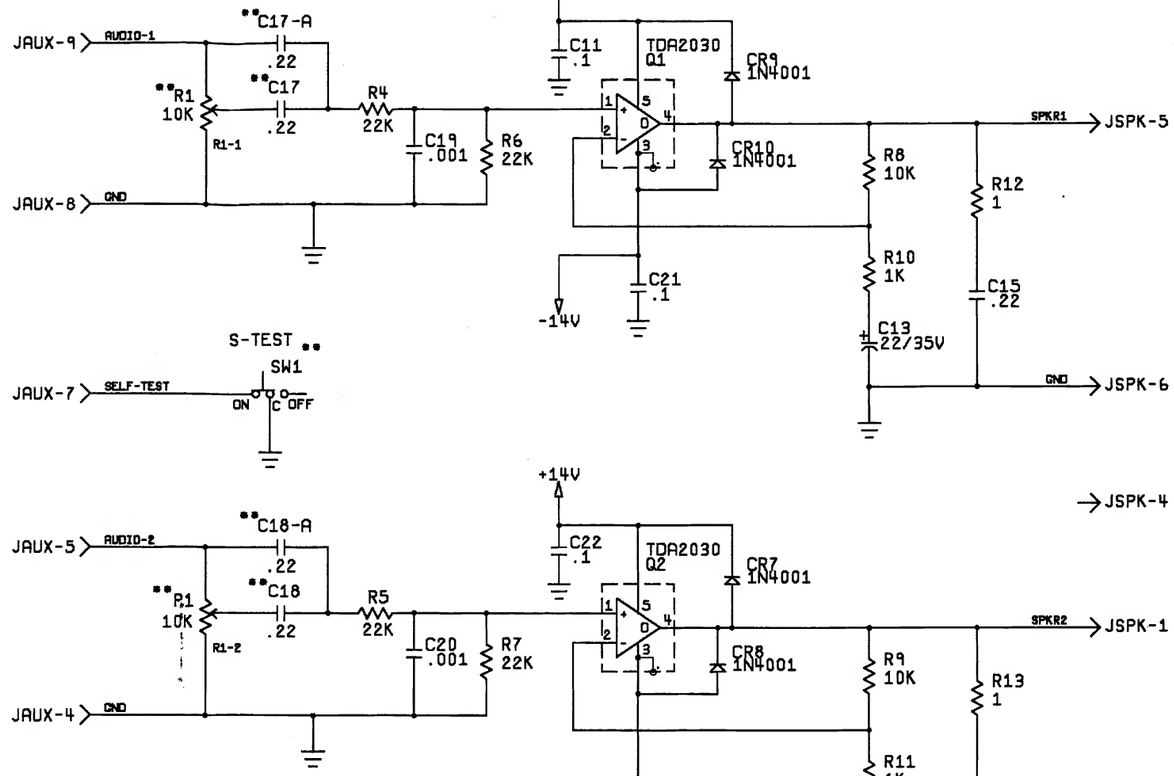

** SEE TABLE BELOW FOR OPTIONAL ITEMS

DESIGNATION	VALUE	-01
R1	10K POT	YES
C17, C18	.22	YES
C17-A, C18-A	.22	NO
SW1	ON/OFF	YES
Q3	SEE VER COL	LM7815
R14	SEE VER COL	0 OHM
R15	0	NO

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Super Sprint™ Audio II
PCB Schematic Diagram

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Continued from Sheet 3A

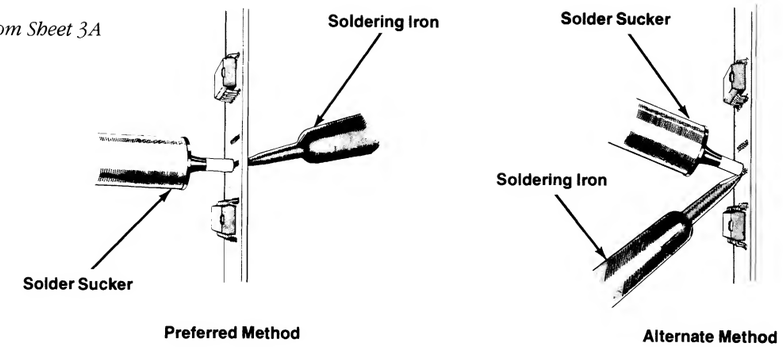

Figure 3 Removing Solder from Plated-Through Holes

Troubleshooting Static-Sensitive Devices

Certain precautions must be taken when working with static-sensitive devices, e.g., microprocessors, field-effect transistors (FET), complementary metal-oxide semiconductors (CMOS), and other large-scale integration (LSI) devices that use metal-oxide semiconductor (MOS) technology. Static charge buildup in a person's body or leakage from an improperly grounded soldering iron can cause static-sensitive devices to fail.

Before handling a static-sensitive device or a PCB with such devices attached to it, ground any static voltage that may have accumulated in your body by touching an object that has been earth grounded. A bare wire wrapped around your wrist and attached to an earth ground is effective when working extensively with static-sensitive devices. When soldering on a static-sensitive device, use a soldering iron with a properly grounded three-wire cord. (Refer to *Soldering Techniques* for a discussion of recommended soldering irons and procedures.)

A static-sensitive device can appear defective due to leakage on a PCB. Observe the precautions for grounding static voltages described in the preceding paragraph and clean both sides of the PCB with flux remover or an eraser before replacing what can be a good static-sensitive device. For discrete FETs, clean thoroughly between the gate, drain, and source leads.

Static-sensitive devices can be packaged in conductive foam or have a protective shorting wire attached to the pins. Remove the conductive foam just prior to inserting the device into its socket or soldering it to a PCB. Remove the shorting wire only *after* the device is inserted into its socket or *after* all the leads are soldered in place.

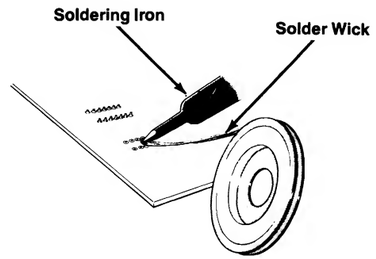

Figure 4 Removing Solder from Wire-Connection Pads

Special Section

Troubleshooting

The information on these pages discusses troubleshooting aids and techniques to help the service technician when trouble is suspected in a game. Most troubles can be located quickly by following this information. However, if problems persist, contact your Atari Games Corporation Customer Service Office for help. The addresses and phone numbers of the two offices are listed on the inside front cover of every game manual.

NOTE

We recommend that troubleshooting and repair procedures be performed by a qualified service technician.

Troubleshooting Aids

Troubleshooting aids are provided throughout the game manual and schematic package. The following information is intended to acquaint the service technician with the portions of these documents that contain useful troubleshooting and repair information.

Assembly and Component Locations

The parts lists in Chapter 5 of the game manual illustrate the locations of assemblies and components. Printed-circuit board (PCB) illustrations aid in rapidly locating components shown on the corresponding schematic diagram(s).

Diagrams

This schematic package supplement for this manual contains schematic diagrams with component locations, active component type numbers, and electrical values.

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Troubleshooting Aids and Techniques

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Troubleshooting Techniques

WARNING

To avoid electrical shock, turn off the game power before attempting to troubleshoot this game.

The following troubleshooting steps are arranged in a sequence recommended for locating a defective component. The procedure begins with a check of the simple trouble possibilities and progresses to more extensive procedures for localizing the problem to an assembly or major circuit, and then to a defective component.

Check Fuses

Check for open fuses. Refer to the power supply parts list in Chapter 5 of the game manual and to the display manual for the location and rating of each fuse used in this game. Make sure that replacement fuses are the proper type and rating.

Check Power-Supply Voltages

Improper operation of all circuits usually indicates a power supply problem. Be sure that the proper line voltage is available to the power supply. Refer to the label on the power supply for its voltage rating.

Localize Trouble

Determine the trouble symptom. Use the wiring diagrams in the schematic package supplement to determine which assemblies or major circuits could cause the trouble. Perform the self-test procedure provided in the operators manual.

Visual Check

Visually check for obvious problems in the portion of the game where the trouble is suspected. For example, check for loose or defective solder connections, integrated circuits loose in their sockets, loose cable connections, broken wires, and damaged PCBs or components.

Check Individual Components

Check soldered-in passive components (e.g., resistors, capacitors, diodes) by disconnecting one end to isolate the measurement from the effects of the surrounding circuitry. Often, direct substitution is the most practical way to determine if a component is faulty. However, eliminate the possibility of some other circuit problem that could damage the substitute component.

Repair the Assembly

CAUTION

Soldered-in transistors and integrated circuits are difficult to remove without damaging the printed-circuit board or component. Refer to the information below that pertains to soldering and replacing integrated circuits and transistors.

Repair or replace the defective part. Refer to Chapter 4 in the game manual and information in this chapter for special removal and replacement procedures. Check for proper operation of the repaired circuit.

Soldering Techniques

Follow these recommendations when removing or replacing components soldered to a PCB. Poor soldering practices can damage a PCB or heat-sensitive electrical components.

Choosing the proper soldering iron is essential before attempting to remove or replace soldered-in components. Excessive heat is a common cause of damage to a component or PCB. However, transient voltages from solder guns or improperly grounded soldering irons can also damage certain voltage-sensitive semiconductor devices. Refer to *Troubleshooting Static-Sensitive Devices* for more specific information.

A 15- to 27-watt pencil-tip soldering iron is recommended to avoid separating the etched circuit wiring from the board material and to avoid damaging active components. A temperature-controlled soldering station rated at 700°F with a fine cone or a very fine chisel tip can also be used.

CAUTION

Solder guns are not recommended for removing or replacing soldered-in components on a printed-circuit board. The added possibility for overheating and the large transient voltage induced by the solder gun could cause damage to heat- or voltage-sensitive devices.

The following additional equipment is recommended for removing and replacing soldered-in components:

- Solder Sucker—Hand-operated vacuum tool used to remove liquified solder from the PCB. We recommend the top-of-the-line Soldapullt® brand.
- Solder Wick—Resin-soaked copper braid used for removing excess solder from the lead connections on the PCB. See *Removing Integrated Circuits* for precautions relating to the use of a solder wick on a multilayer PCB with plated-through holes.
- Flux Remover—Non-corrosive chemical used to clean foreign material from the PCB before soldering and to remove any flux residue where components have been replaced. Also used to clean any foreign material from the PCB during preventive maintenance. Isopropyl alcohol is recommended.
- Acid Brush—Small stiff-bristled paint or toothbrush used with flux remover to clean flux and other foreign material from the PCB.

Removing Integrated Circuits

The easiest and safest method for removing soldered-in integrated circuits (IC) from a PCB is to cut off each pin as close to the IC case as possible with a tip dyke (diagonal cutter) as shown in Figure 1.

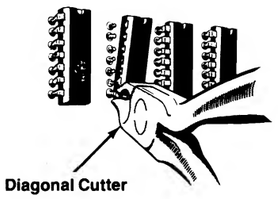

Figure 1 Removing IC (Cut-Pin Method)

Use the proper soldering iron as previously described under *Soldering Techniques*. Then, to avoid excessive heat buildup in one area of the PCB, apply heat directly to each pin in a random order. Remove the loosened pin with the tip of the soldering iron or a needle-nose pliers as shown in Figure 2. Allow a moment for the PCB to cool before proceeding to the next pin. Apply just enough heat to remove any stubborn pins.

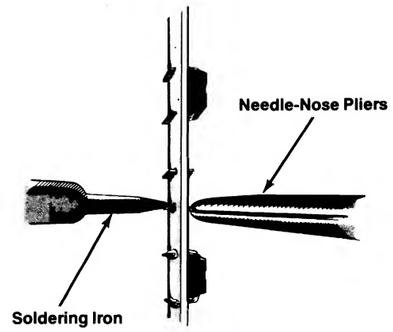

Figure 2 Removing IC Pins

For a multi-layer PCB with plated-through holes, use a solder sucker to remove the remaining solder from inside each hole as shown in Figure 3. If possible, suck the solder from the opposite side of the PCB from where the heat is applied.

Use a solder wick to remove excess solder from around the lead connection pads on the top and/or bottom surface of the PCB as shown in Figure 4.

CAUTION

Do not use a solder wick to remove solder from inside plated-through holes. The heat required for the solder wick to remove the solder from inside the hole could damage the PCB.

Use an integrated-circuit (IC) pulling tool to remove socketed ICs. Do not pry up on one end of the ICs, because the pins could be bent or broken.

Continued on Sheet 2B

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Troubleshooting Aids and Techniques

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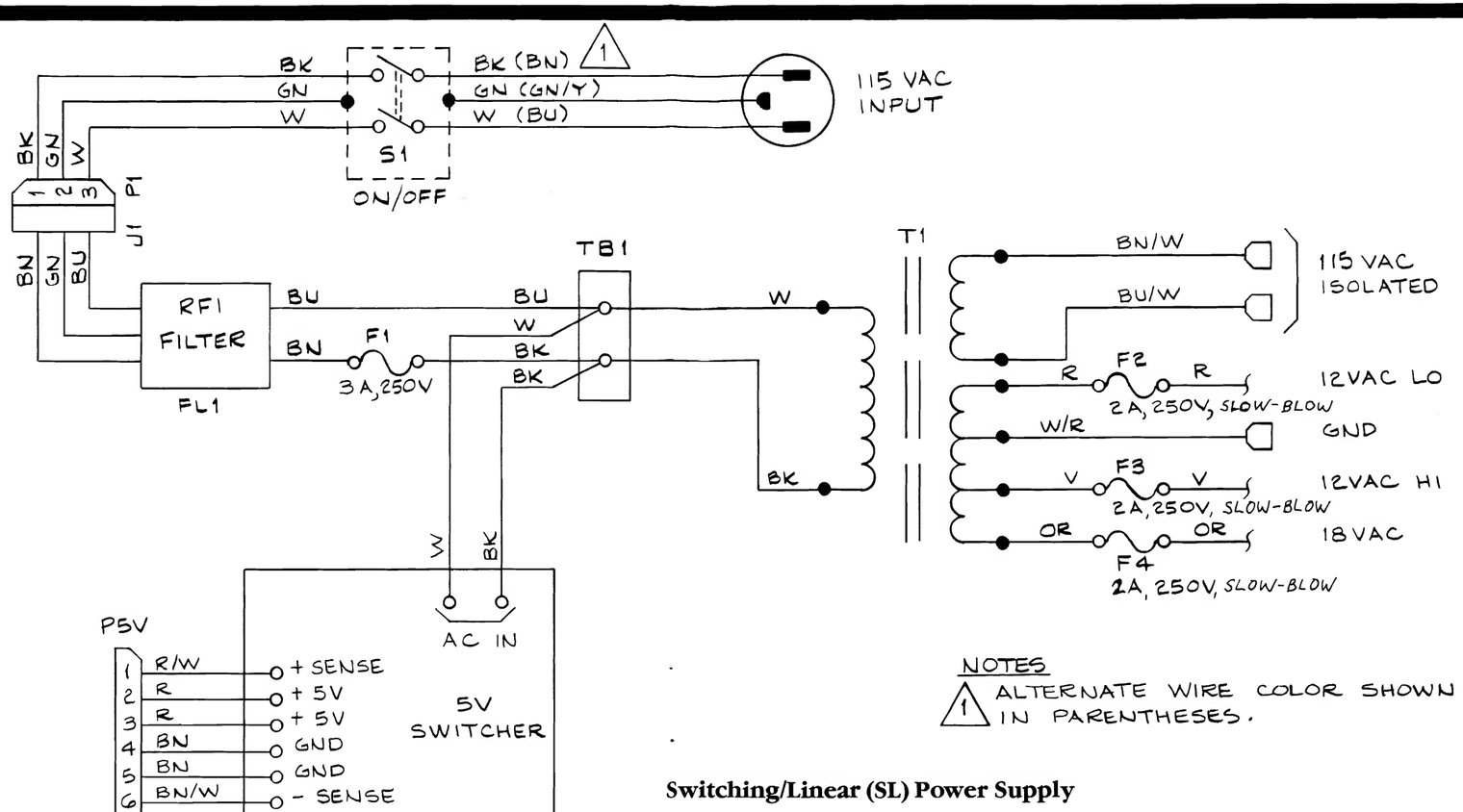
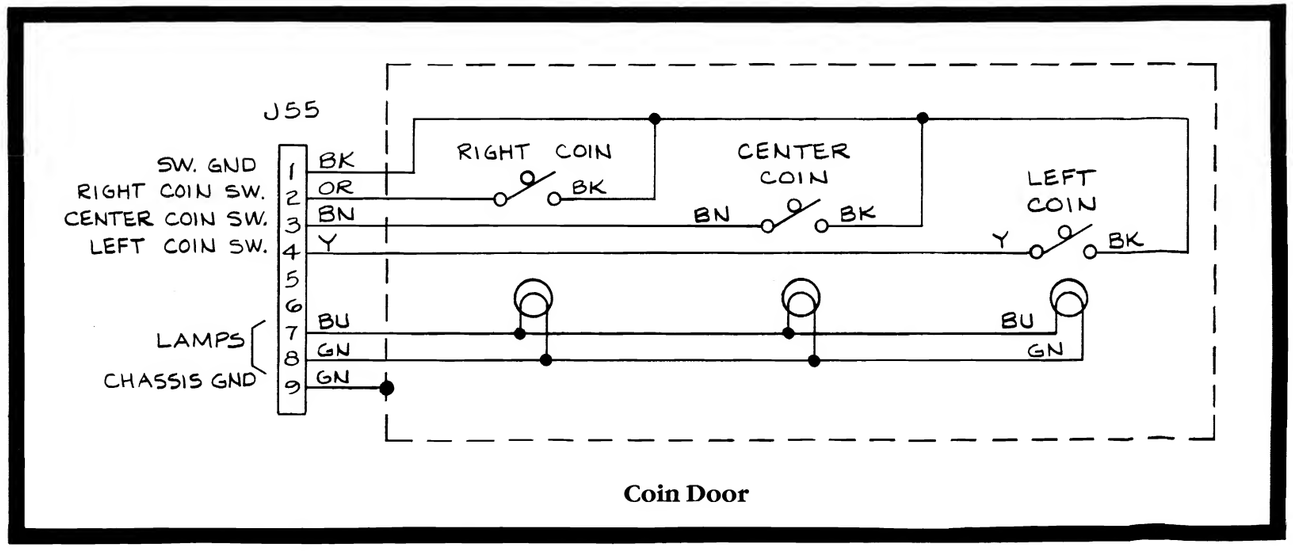


NOTES

1. ALTERNATE WIRE COLOR SHOWN IN PARENTHESES.

Switching/Linear (SL) Power Supply



Coin Door

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Switching/Linear (SL) Power Supply and Coin Door Wiring Diagrams

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Main Microprocessor (T-11) Memory Map

Octal	Address Bus Signal Lines A15 A14 A13 A12 A11 A10 A09 A08 A07 A06 A05 A04 A03 A02 A01 A00	R/W	Data Bus Signal Lines D15 D14 D13 D12 D11 D10 D09 D08 D07 D06 D05 D04 D03 D02 D01 D00	Function and Size
000000-007777	0 0 0 0 A A A A A A A A A A A A A A	R/W	D D D D D D D D D D D D D D D D	Program RAM (4KB)
010000-010436	0 0 0 1 0 0 A A A A A A A A A 0	W	D D D D D D D D D D D D D D D D	Color RAM (144W)
"	0 0 0 1 0 0 A A A A A A A A A 0	W	D D D D	Z (Intensity)
"	0 0 0 1 0 0 A A A A A A A A A 0	W	D D D D	Blue
"	0 0 0 1 0 0 A A A A A A A A A 0	W	D D D D	Green
"	0 0 0 1 0 0 A A A A A A A A A 0	W	D D D D	Red
010000-010176	0 0 0 1 0 0 0 0 A A A A A A A 0	W	D D D D D D D D D D D D D D D D	Motion Object Color RAM (64W
010200-010276	0 0 0 1 0 0 0 1 A A A A A A A 0	W	D D D D D D D D D D D D D D D D	Alphanumeric Color RAM (16W)
010400-010776	0 0 0 1 0 0 1 0 0 0 A A A A A 0	W	D D D D D D D D D D D D D D D D	Playfield Color RAM (128W)
012000	0 0 0 1 0 1 0 0 0 0 0	W	D D D D D D	Program Page 0 Address
012002	0 0 0 1 0 1 0 0 0 0 1	W	D D D D D D	Program Page 1 Address
012200	0 0 0 1 0 1 0 0 1	W		A/D Converter Start Strobe
012000-012002	0 0 0 1 0 1 0 A	R	D D D D D D D D	A/D Converter Output
012400	0 0 0 1 0 1 0 1 0	W	D D	Video Memory Page Select (VMMU)
012600	0 0 0 1 0 1 0 1 1 0 0	W		IRQ0 Clear
012640	0 0 0 1 0 1 0 1 1 0 1	W		6502 Reset
012700	0 0 0 1 0 1 0 1 1 1 0	W		IRQ2 Clear
012740	0 0 0 1 0 1 0 1 1 1 1	W		IRQ3 Clear
013000	0 0 0 1 0 1 1 0 0	W	D	IRQ0 Enable 6502 RD (Active High)
013000	0 0 0 1 0 1 1 0 0	W	D	IRQ1 Enable 6502 WT (Active High)
013000	0 0 0 1 0 1 1 0 0	W	D	IRQ2 Enable 32V (Active High)
013000	0 0 0 1 0 1 1 0 0	W	D	IRQ3 Enable VBLANK (Active High)
013200	0 0 0 1 0 1 1 0 1	W	D D D D D D D D	Communications Port Write
013400	0 0 0 1 0 1 1 1 0	W	D D D D D D D D D D D D D D D D	Horizontal Scroll & PF Bank 0
013600	0 0 0 1 0 1 1 1 1	W	D D D D D D D D D D D D D D D D	Vertical Scroll & PF Bank 1
014000	0 0 0 1 1 0 0 0 0	R	D	SW 6 (Active Low)
014000	0 0 0 1 1 0 0 0 0	R	D	SW 5 (Active Low)
014000	0 0 0 1 1 0 0 0 0	R	D	SW 4 (Active Low)
014000	0 0 0 1 1 0 0 0 0	R	D	SW 3 (Active Low)
014000	0 0 0 1 1 0 0 0 0	R	D	6502 Comm. Flag (Active High)
014000	0 0 0 1 1 0 0 0 0	R	D	T-11 Comm. Flag (Active High)
014000	0 0 0 1 1 0 0 0 0	R	D	SW 2 (Active Low)
014000	0 0 0 1 1 0 0 0 0	R	D	SW 1 (Active Low)
014000	0 0 0 1 1 0 0 0 0	R	D	Self-Test (Active Low)
016000	0 0 0 1 1 1 0 0 0	R	D D D D D D D D	Communications Port Read
020000-033776	0 0 1 A A A A A A A A A A A A A 0	R/W	D D D D D D D D D D D D D D D D	Alphanumerics RAM (VMMU=0) (3KW)
"	0 0 1 A A A A A A A A A A A A A 0	R/W	D D D D D D D D D D D D	ANPIC
034000-037776	0 0 1 1 1 A A A A A A A A A A A 0	R/W	D D D D D D D D D D D D D D D D	Motion Object RAM (VMMU=0) (1KW)
"	0 0 1 1 1 A A A A A A A A A 0 0 0	R/W	D D D D D D D D D D D D	MOV
"	0 0 1 1 1 A A A A A A A A A 0 1 0	R/W	D D D D D D D D D D D D	MOPIC
"	0 0 1 1 1 A A A A A A A A A 1 0 0	R/W	D D D D D D D D D D	MOH
"	0 0 1 1 1 A A A A A A A A A 1 1 0	R/W	D D D D D D D D D D D	MOLNK
020000-037776	0 0 1 A A A A A A A A A A A A A 0	R/W	D D D D D D D D D D D D D D D D	Playfield RAM Top (VMMU=2) (4KW)
020000-037776	0 0 1 A A A A A A A A A A A A A 0	R/W	D D D D D D D D D D D D D D D D	Playfield RAM Bottom (VMMU=3) (4KW)
040000-057776	0 1 0 A A A A A A A A A A A A A 0	R	D D D D D D D D D D D D D D D D	Paged Program (Page 0) (4KW)
060000-077776	0 1 1 A A A A A A A A A A A A A 0	R	D D D D D D D D D D D D D D D D	Paged Program (Page 1) (4KW)
100000-177776	1 A A A A A A A A A A A A A A 0	R	D D D D D D D D D D D D D D D D	Program ROM (16KW)

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Super Sprint™ Main Microprocessor Memory Map

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Sound Microprocessor (6502) Memory Map

Hexa-decimal	A15	A14	A13	A12	A11	A10	A9	A8	A7	A6	A5	A4	A3	A2	A1	A0	R/W	D7	D6	D5	D4	D3	D2	D1	D0	Function and Size
0000-0FFF	0	0	0	0	A	A	A	A	A	A	A	A	A	A	A	A	R/W	D	D	D	D	D	D	D	D	Program RAM (4KB)
1000-17FF	0	0	0	1	0	A	A	A	A	A	A	A	A	A	A	A	R/W	D	D	D	D	D	D	D	D	EEROM (2KB)
1800-180F	0	0		1	1				0	0	0	A	A	A	A		R/W	D	D	D	D	D	D	D	D	POKEY 1 (16B)
1810-1813	0	0		1	1				0	0	1			A	A		R	D	D	D	D	D	D	D	D	LETA
1830-183F	0	0		1	1				0	1	1	A	A	A	A		R/W	D	D	D	D	D	D	D	D	POKEY 2 (16B)
1840	0	0		1	1				1	0	0						R								D	T-11 Talk (Active High)
1840	0	0		1	1				1	0	0						R						D			6502 Talk (Active High)
1840	0	0		1	1				1	0	0						R					D				TI READY (Active High)
1840	0	0		1	1				1	0	0						R				D					
1840	0	0		1	1				1	0	0						R			D						Self-Test Switch (Active Low)
1840	0	0		1	1				1	0	0						R		D							Auxiliary Coin Switch (Active Low)
1840	0	0		1	1				1	0	0						R	D								Left Coin Switch (Active Low)
1840	0	0		1	1				1	0	0						R	D								Right Coin Switch (Active Low)
1850-1851	0	0		1	1				1	0	1					A	R	D	D	D	D	D	D	D	D	Yamaha Sound Chip
1860	0	0		1	1				1	1	0						R	D	D	D	D	D	D	D	D	Communications Port Read
1870	0	0		1	1				1	1	1	0	0	0			W	D	D	D	D	D	D	D	D	TI Data
1872-1873	0	0		1	1				1	1	1	0	0	1	A		W									TI Write Enable
1874	0	0		1	1				1	1	1	0	1	0			W	D	D	D	D	D	D	D	D	Communications Port Write
1876	0	0		1	1				1	1	1	0	1	1			W								D	Right Coin Counter (Active High)
1876	0	0		1	1				1	1	1	0	1	1			W						D			Left Coin Counter (Active High)
1878	0	0		1	1				1	1	1	1	0	0			W									IRQ Clear
187A	0	0		1	1				1	1	1	1	0	1			W					D	D	D		Yamaha Mixer
187A	0	0		1	1				1	1	1	1	0	1			W				D	D				POKEY Mixer
187A	0	0		1	1				1	1	1	1	0	1			W	D	D	D						TI Sound Mixer
187C	0	0		1	1				1	1	1	1	1	0			W					D				LED 1
187C	0	0		1	1				1	1	1	1	1	0			W				D					LED 2
187C	0	0		1	1				1	1	1	1	1	0			W			D						LETA Resolution
187C	0	0		1	1				1	1	1	1	1	0			W		D							TI Frequency Select
187E	0	0		1	1				1	1	1	1	1	1			W								D	Sound Enable (Active High)
4000-7FFF	0	1	A	A	A	A	A	A	A	A	A	A	A	A	A	A	R	D	D	D	D	D	D	D	D	Program ROM (16KB)
8000-FFFF	1	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	R	D	D	D	D	D	D	D	D	Program ROM (32KB)

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ATARI GAMES

Super Sprint™ Sound Microprocessor Memory Map

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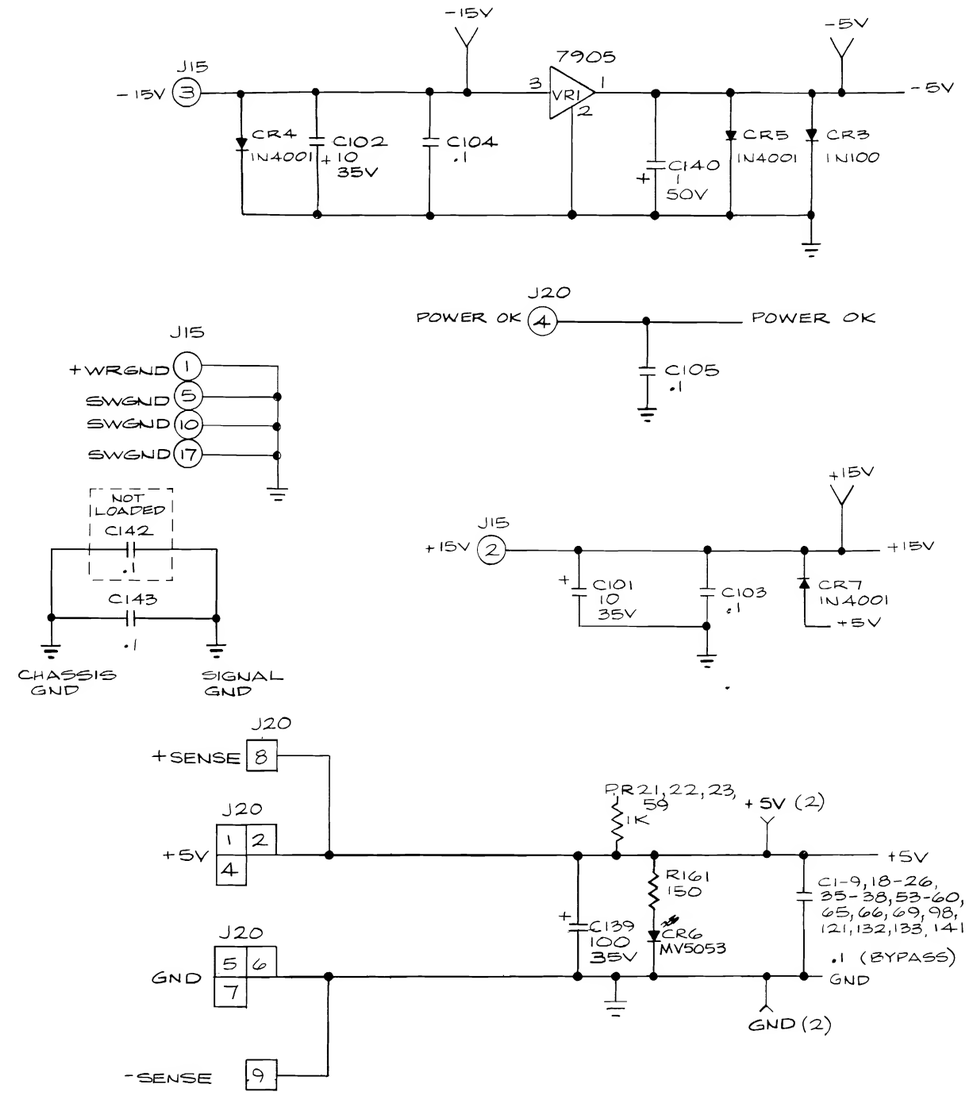
SP-290 Sheet 4B
1st printing



NOTES:

- CONNECTOR J20
- CONNECTOR P18
- CONNECTOR J15

Power Input

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ATARI GAMES

Super Sprint™ CPU PCB
Schematic Diagram

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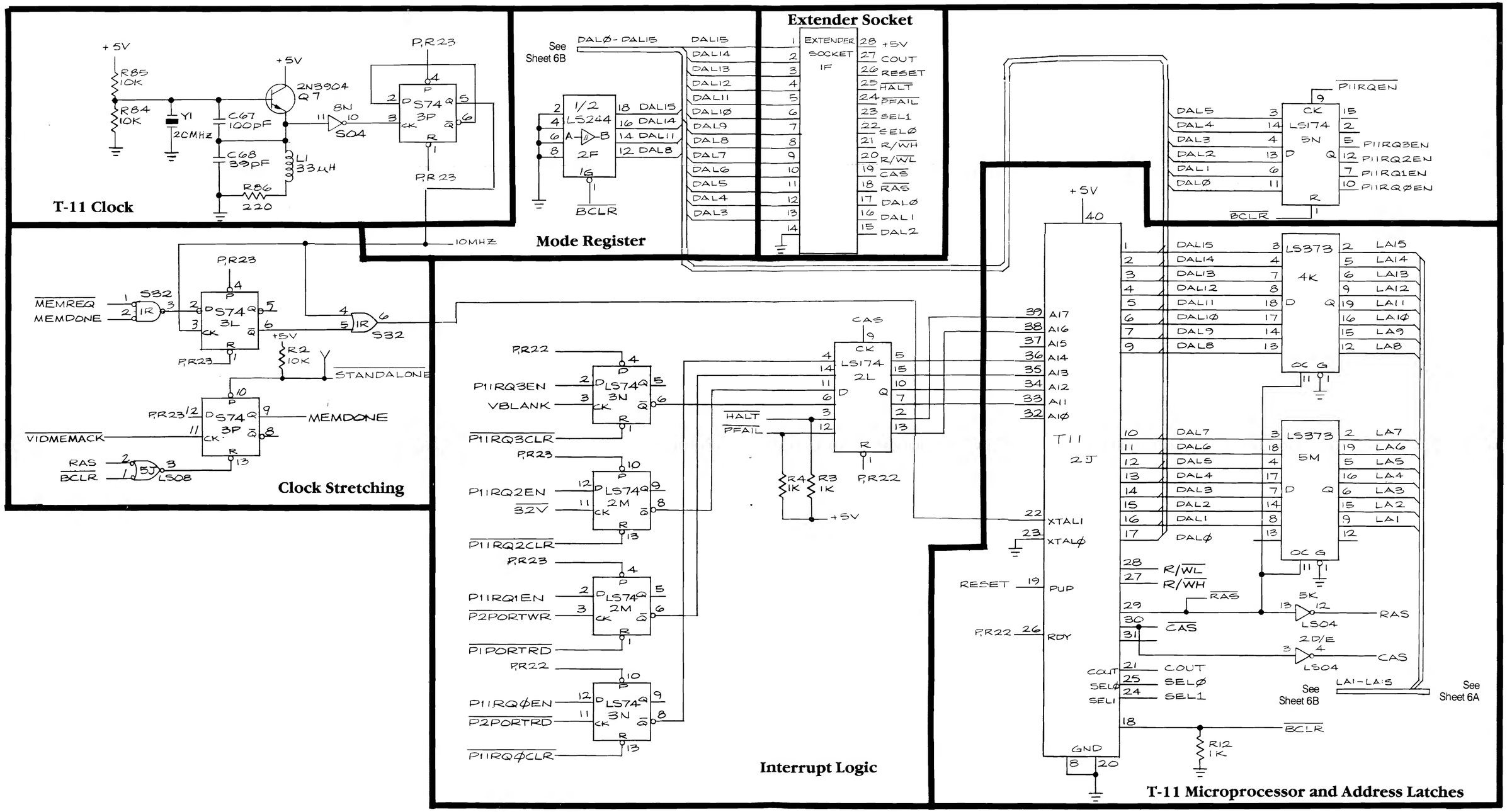
SP-290 Sheet 5A
1st printing



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Super Sprint™ CPU PCB Schematic Diagram

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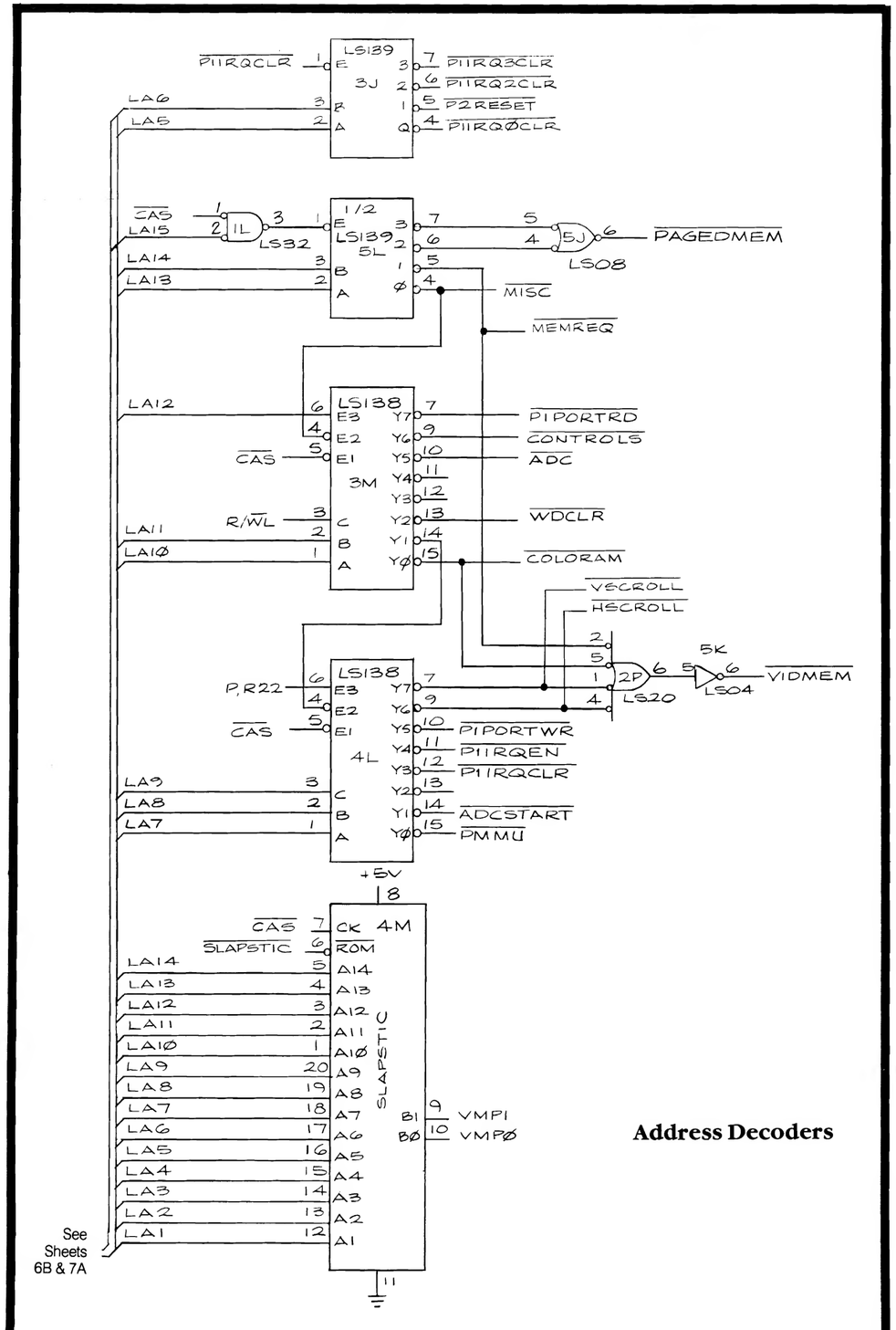
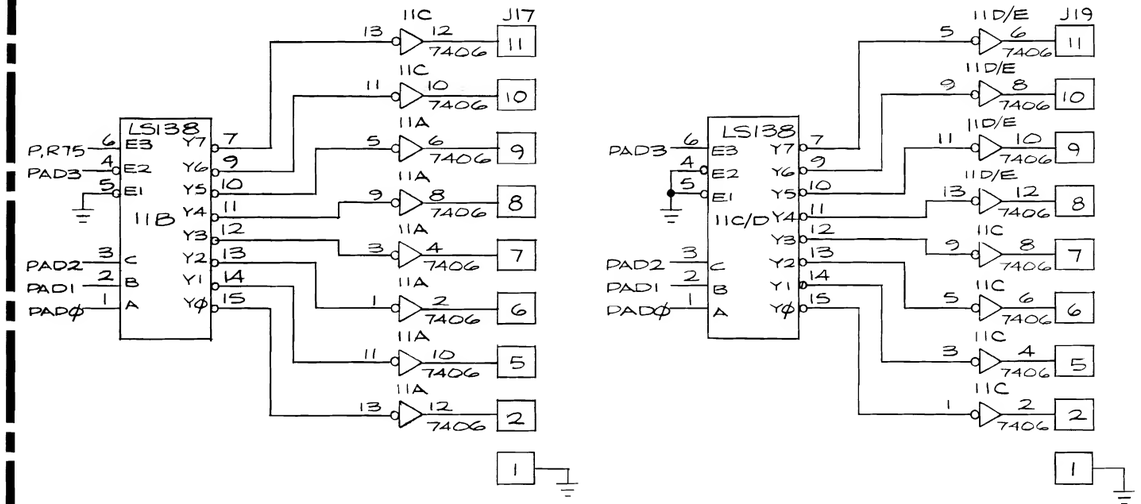
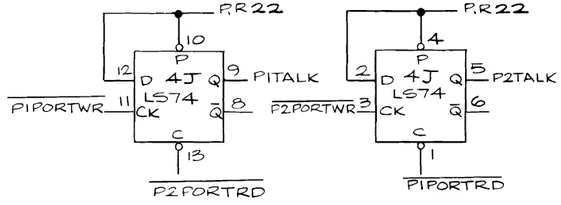


Address Decoders

Used in Development Only





6502 Microprocessor Communication Flags

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Super Sprint™ CPU PCB Schematic Diagram

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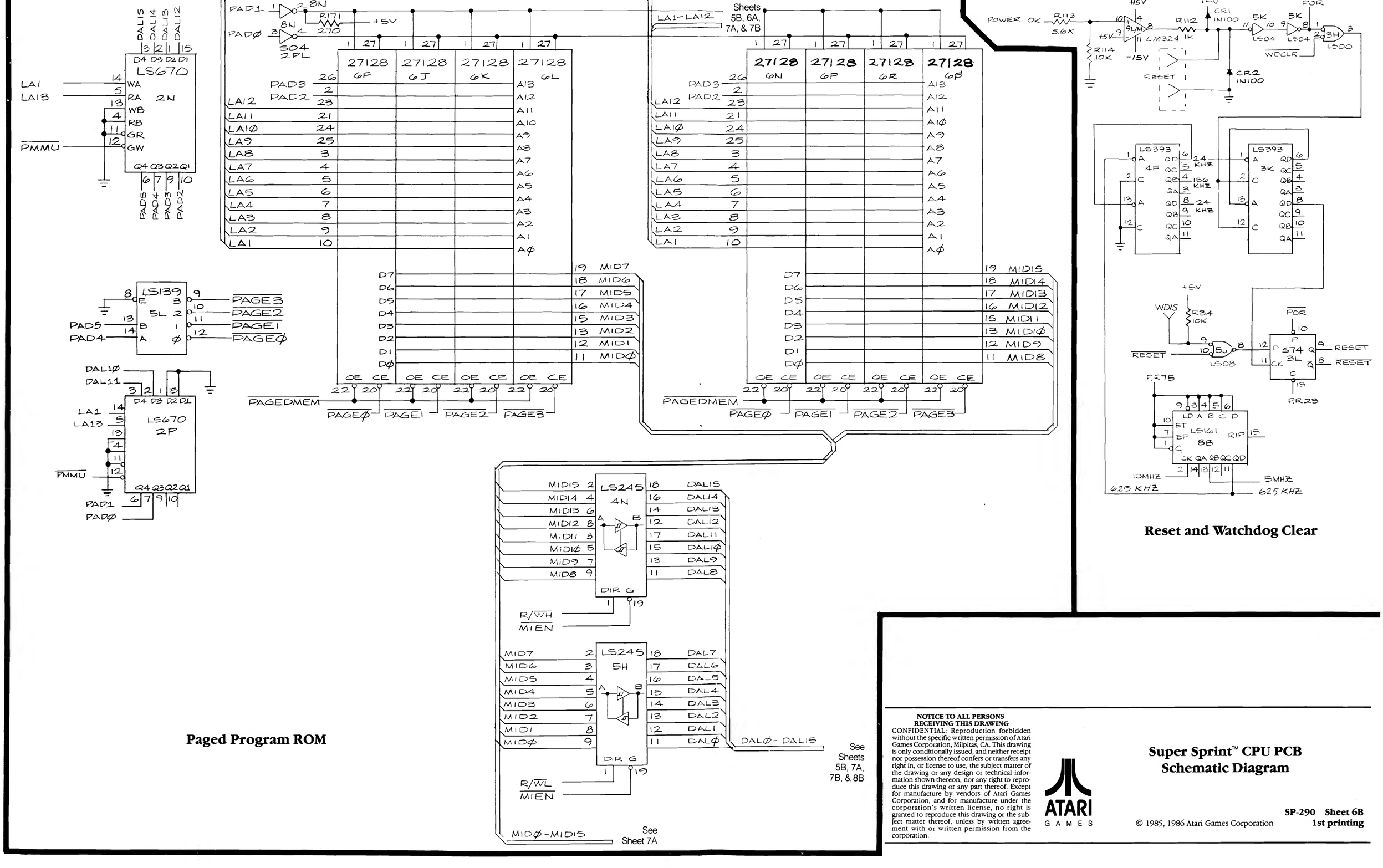
SP-290 Sheet 6A
1st printing



Paged Program ROM

Reset and Watchdog Clear

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Super Sprint™ CPU PCB Schematic Diagram

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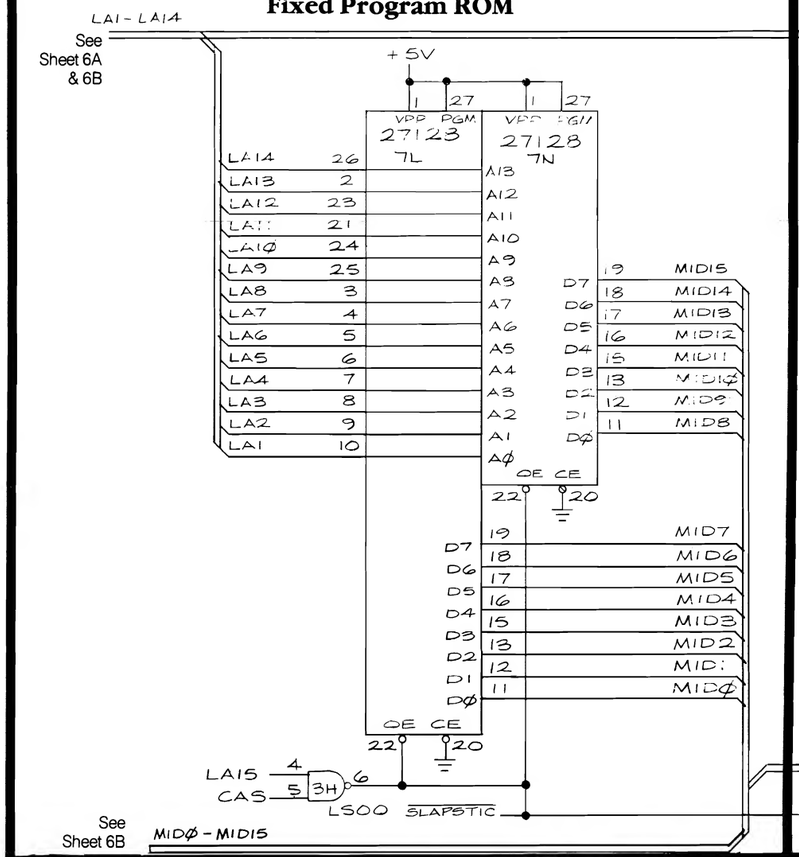
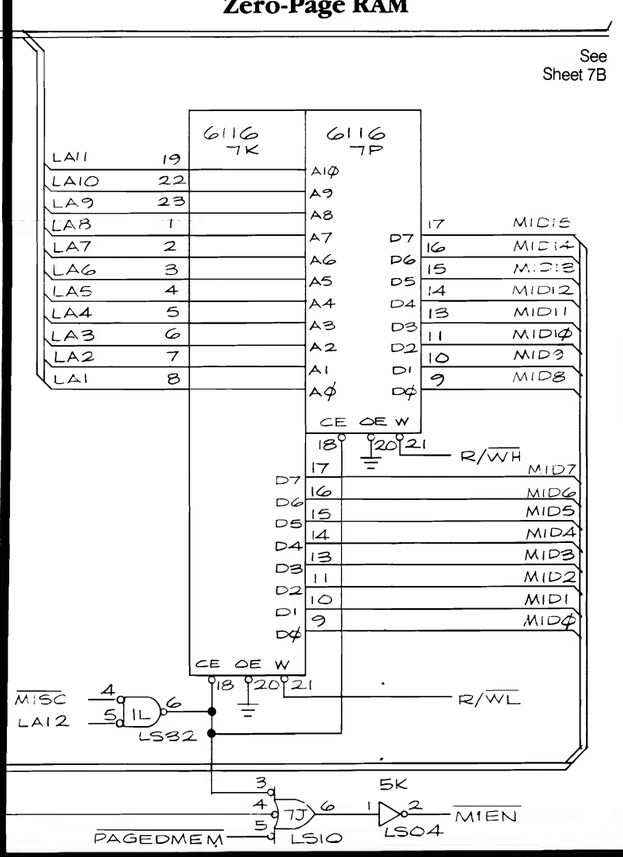
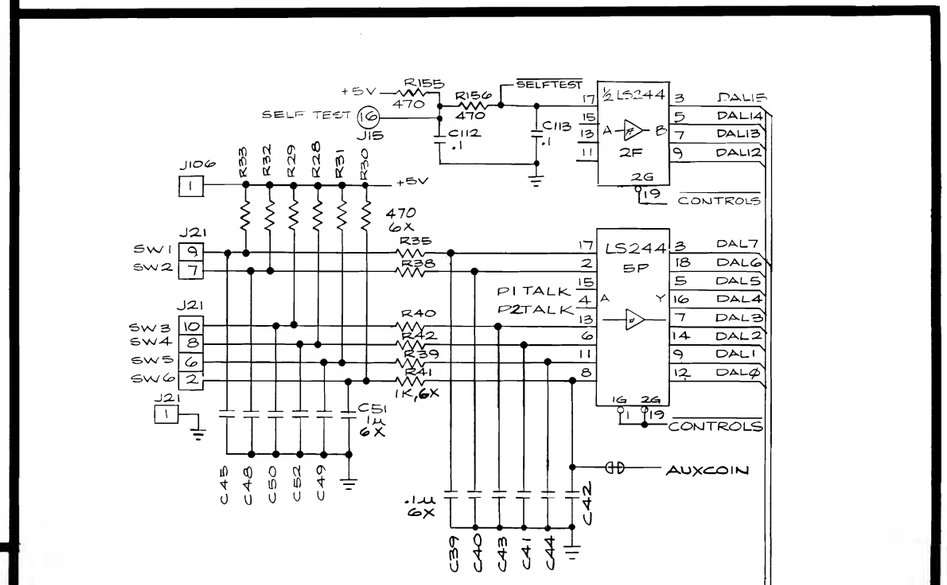
Fixed Program ROM



Zero-Page RAM

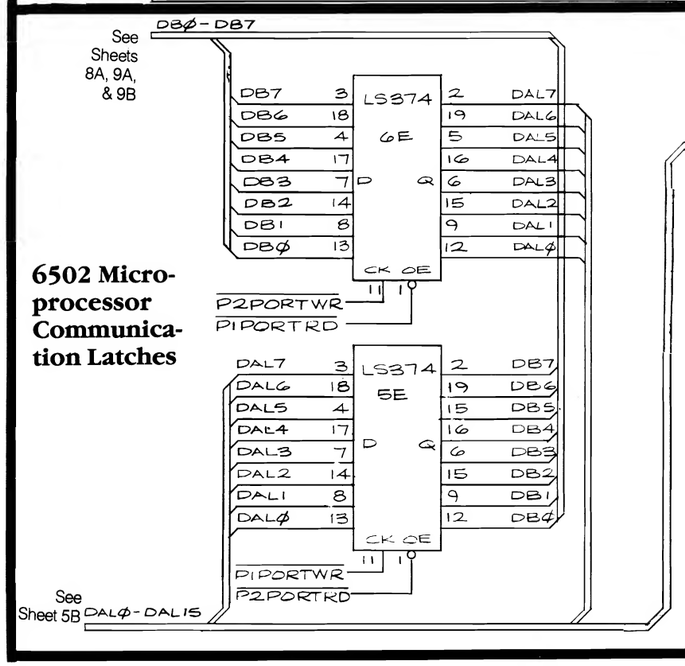


Control Panel Inputs



See Sheet 5B

6502 Microprocessor Communication Latches



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Super Sprint™ CPU PCB Schematic Diagram

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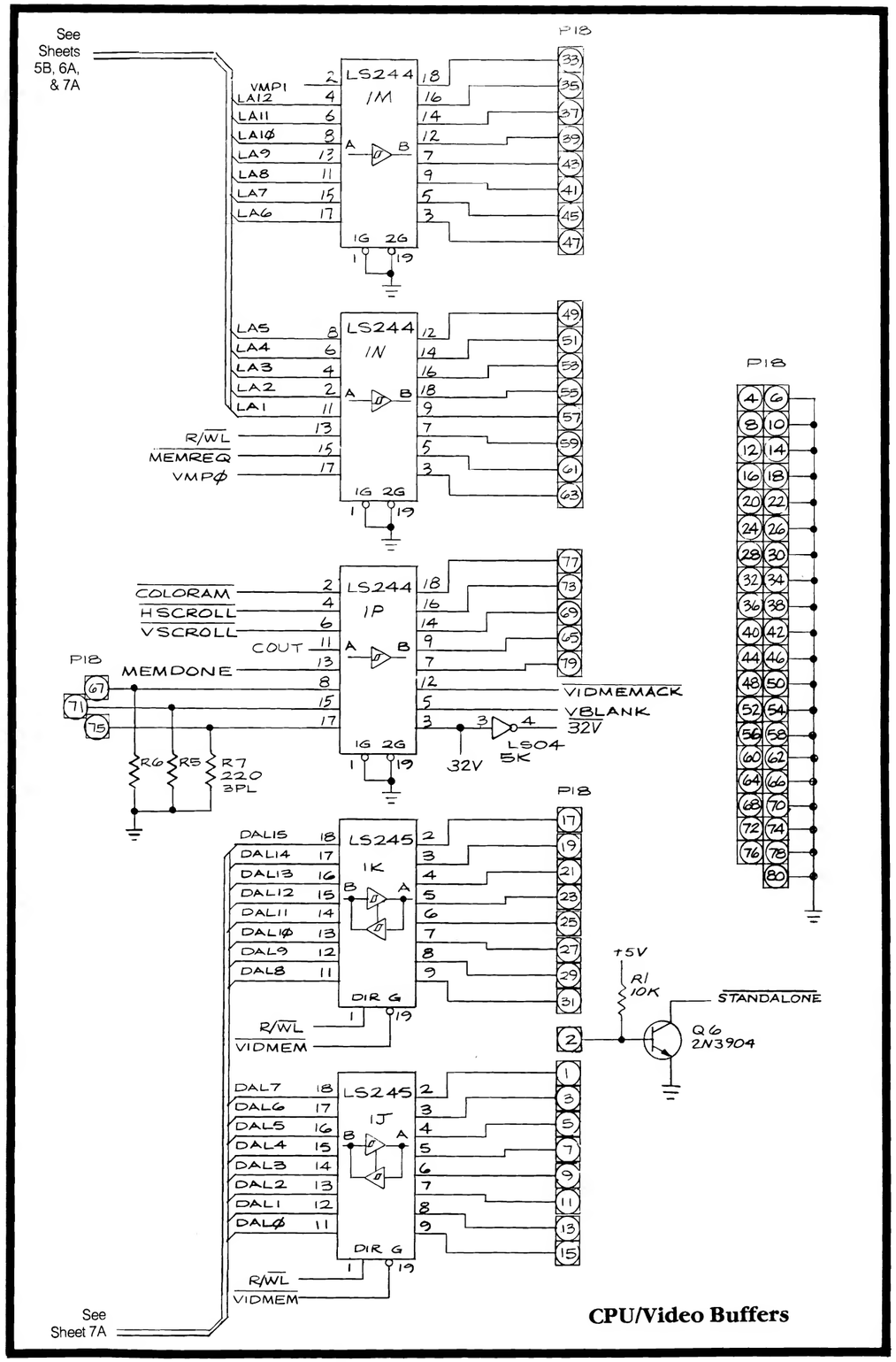
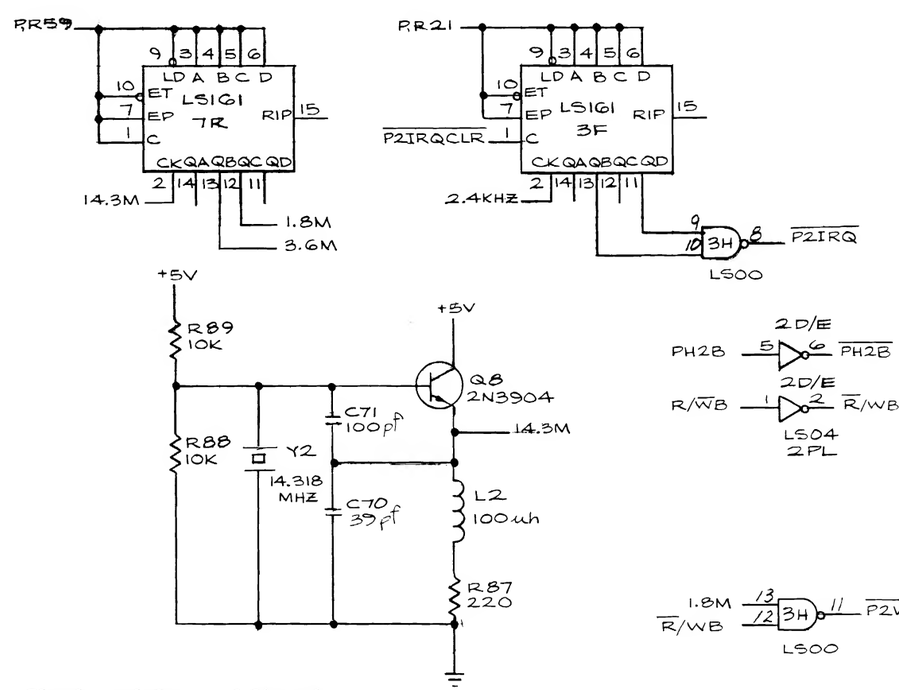
1st printing



CPU/Video Buffers



Clock and Control Signals

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Super Sprint™ CPU PCB Schematic Diagram

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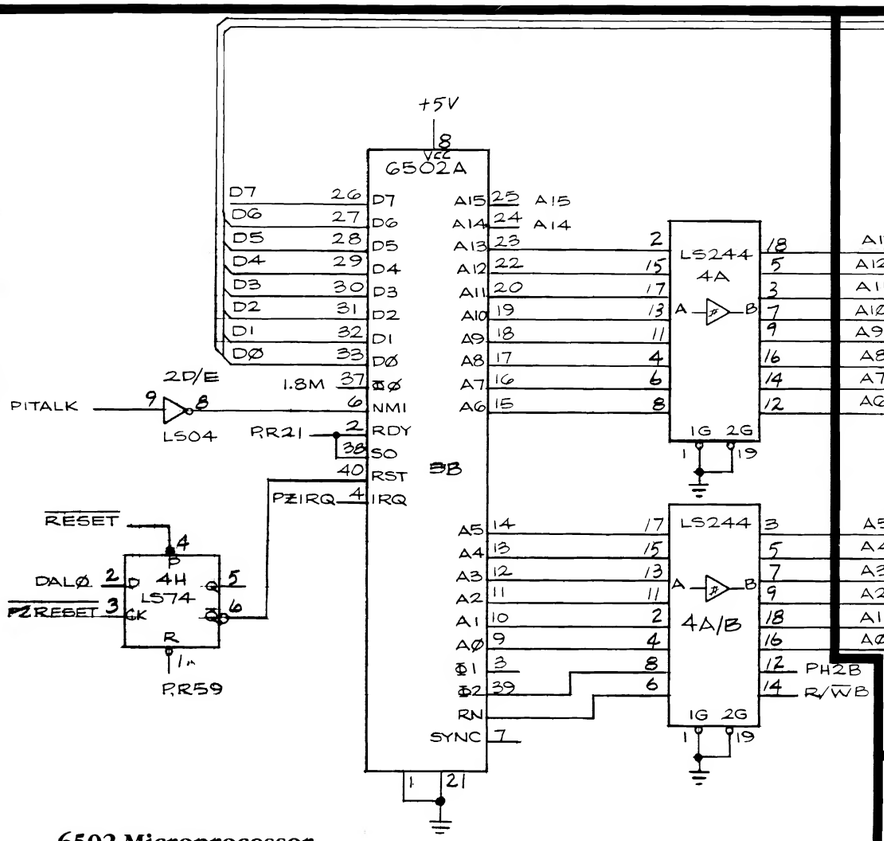
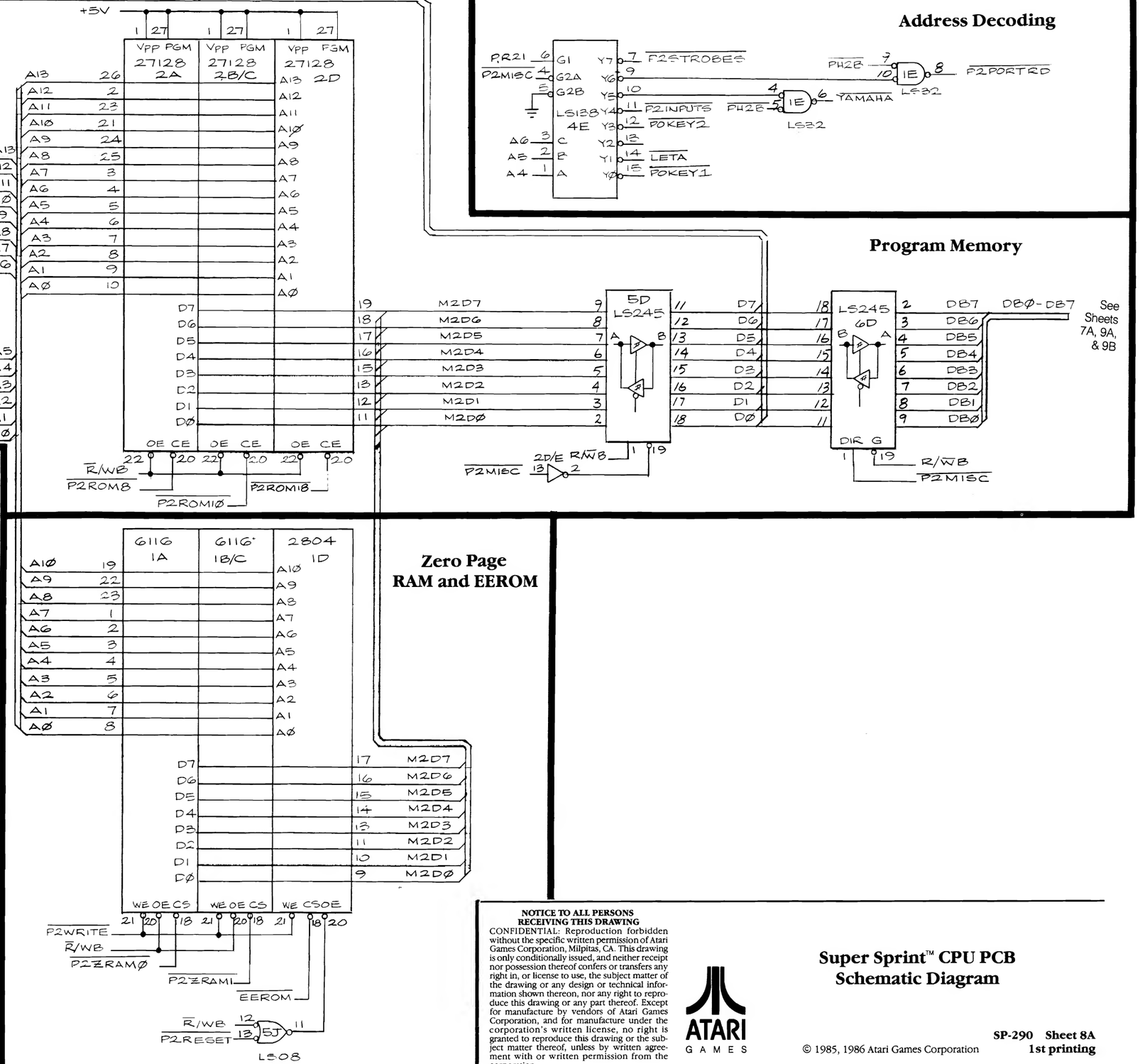
6502 Microprocessor



Program Memory



Address Decoding

Zero Page RAM and EEROM

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Super Sprint™ CPU PCB Schematic Diagram

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1st printing

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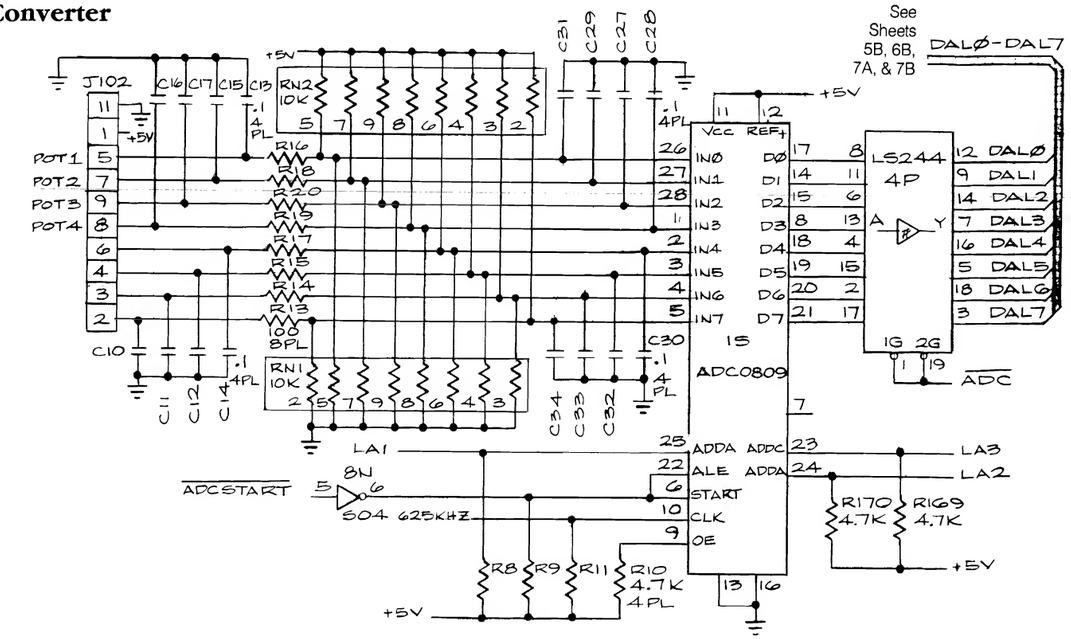
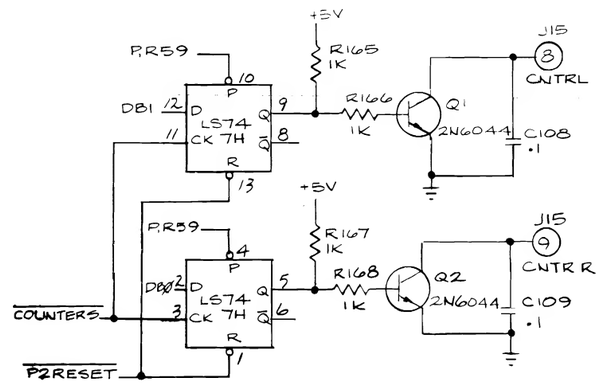
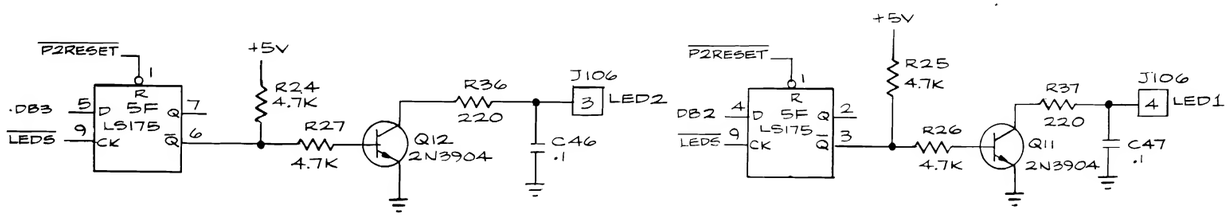
A/D Converter



Coin Counters



LED Drivers



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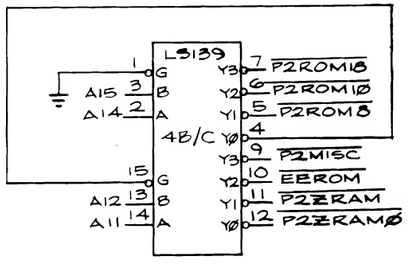
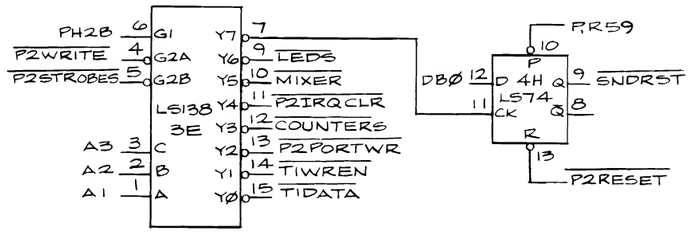


Address Decoding



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Super Sprint™ CPU PCB Schematic Diagram

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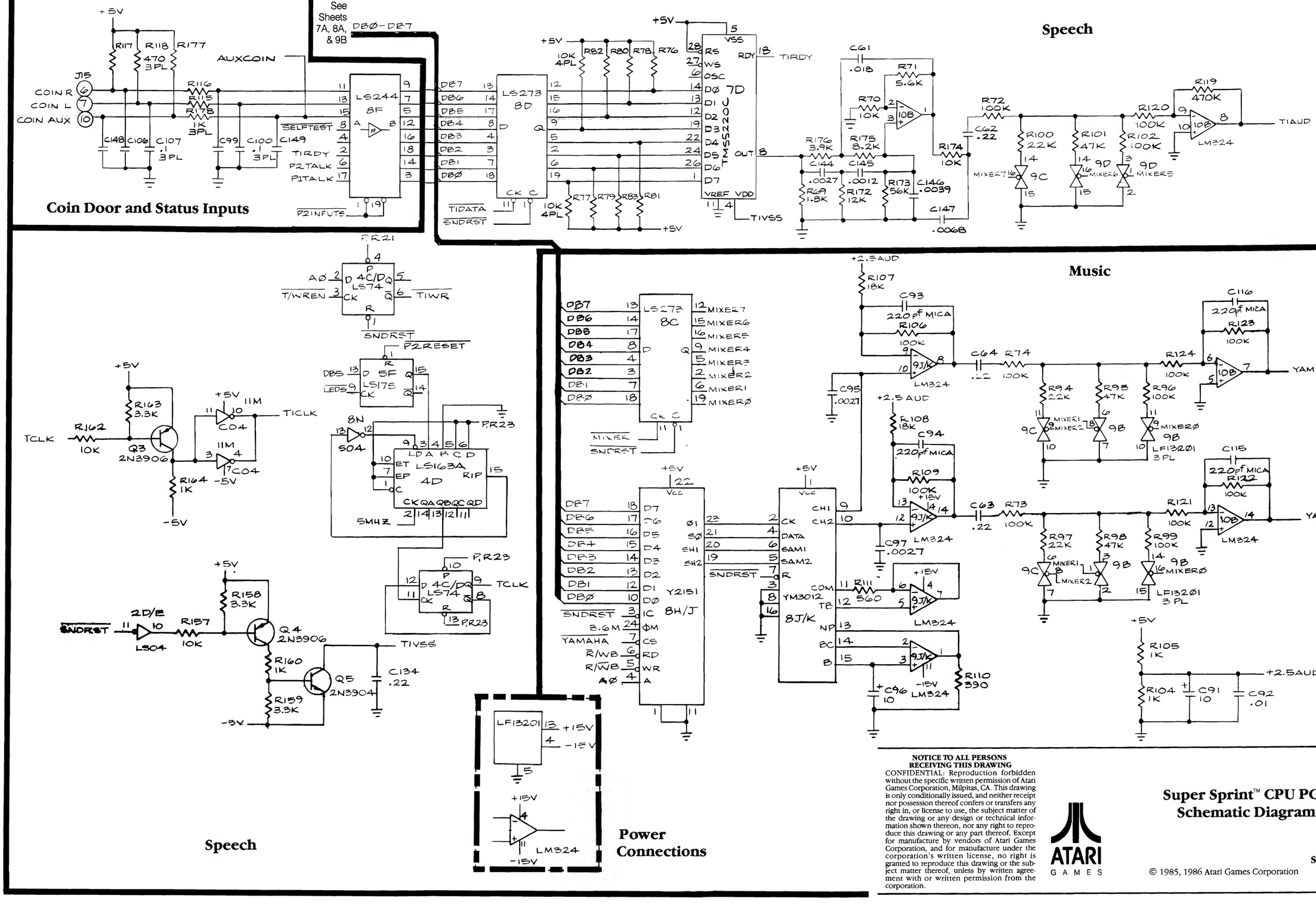

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Super Sprint™ CPU PCB Schematic Diagram

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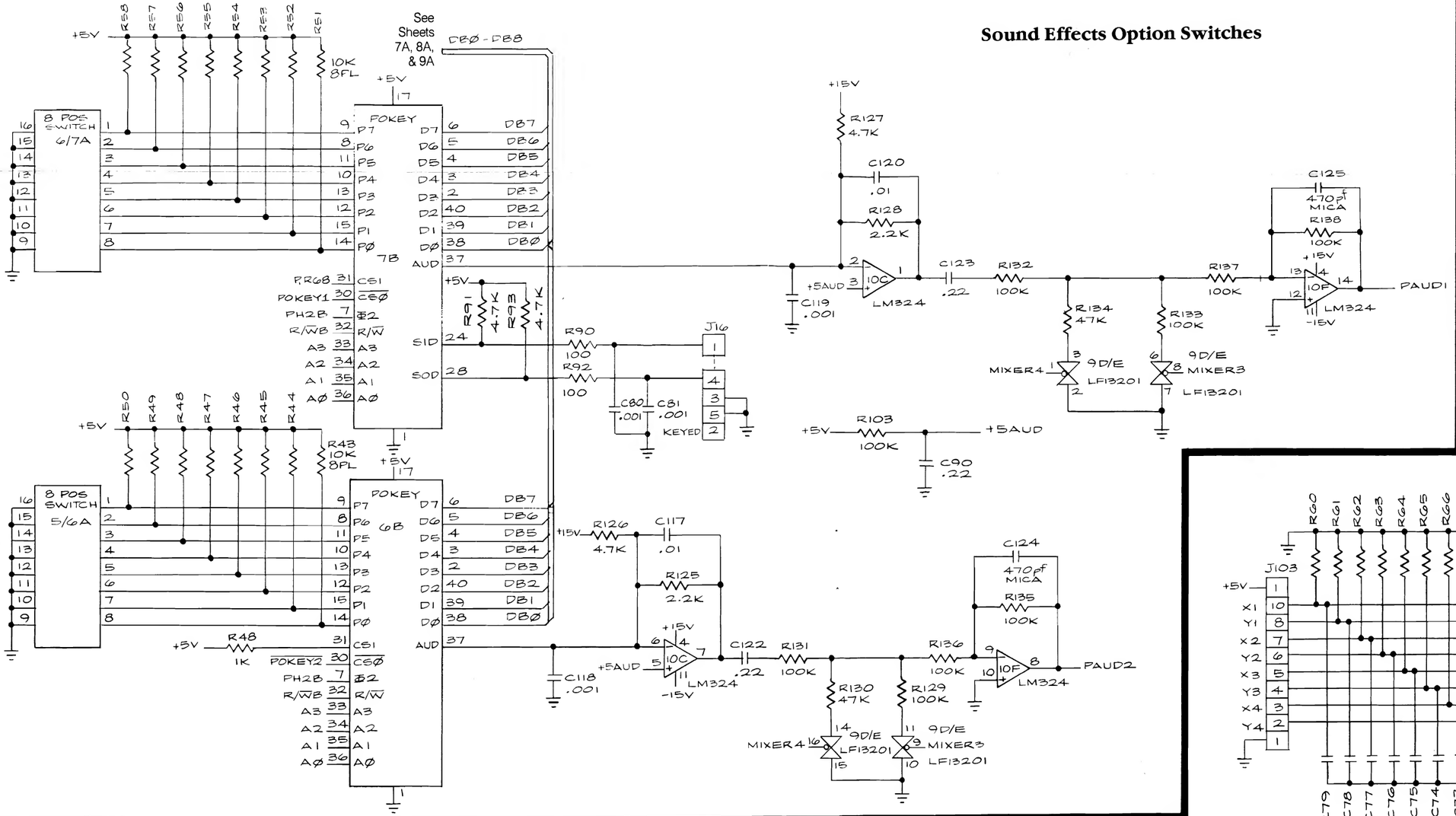
Sound Effects Option Switches

Steering Wheel Inputs



Audio Output Drivers

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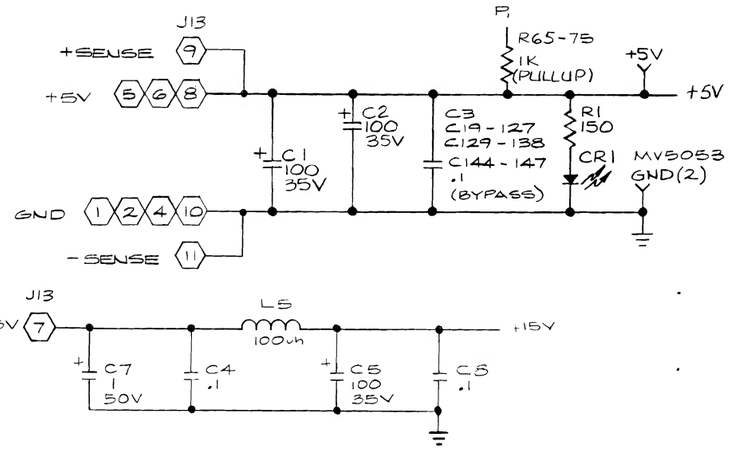
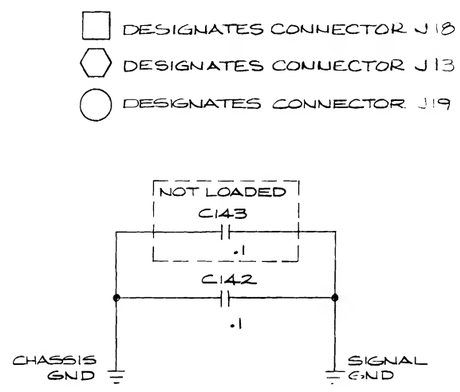
Power Input





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Super Sprint™ Video PCB
Schematic Diagram

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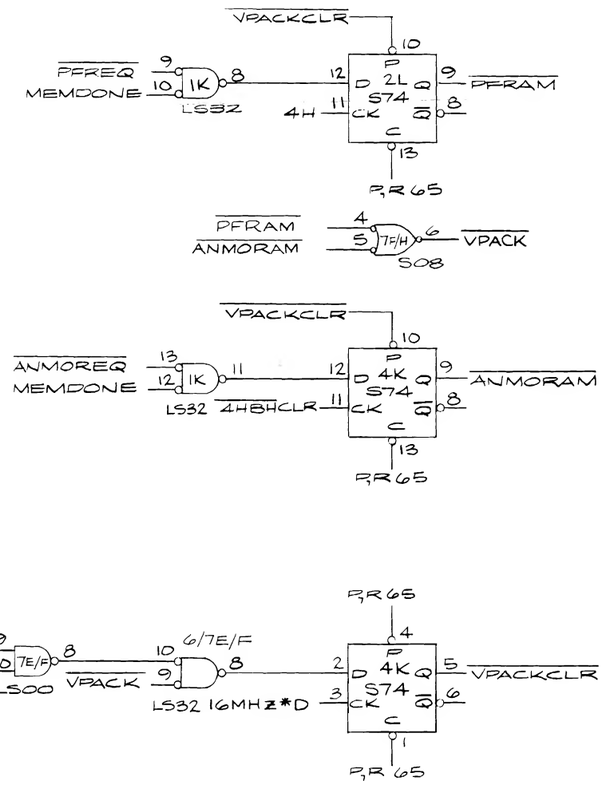
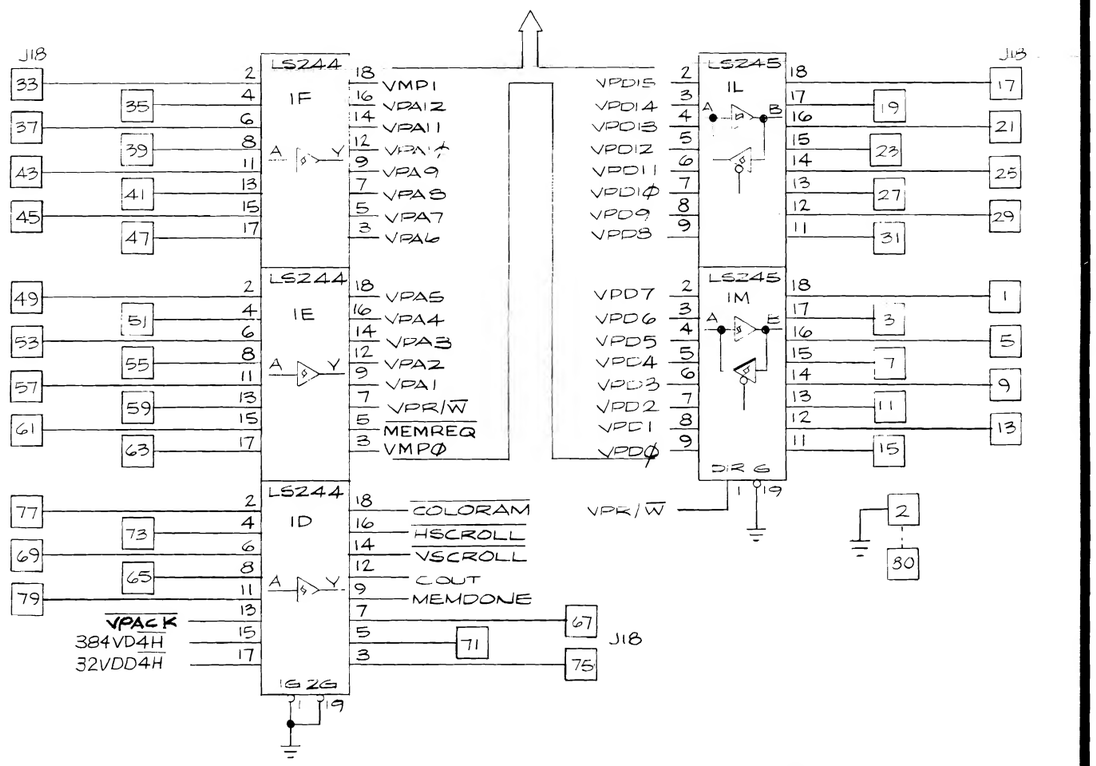


Address Decoding Control Signals



Video/CPU Buffers

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Super Sprint™ Video PCB Schematic Diagram

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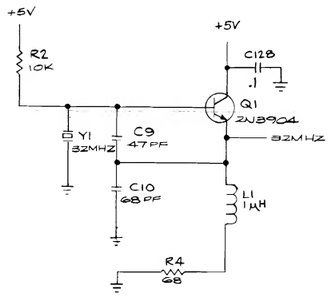
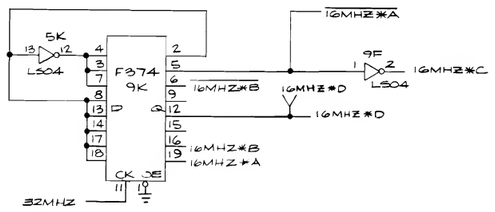
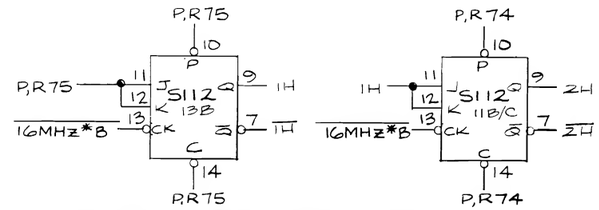
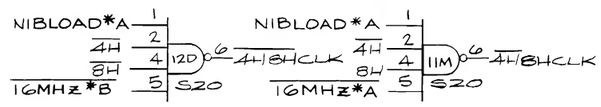
Video Clock

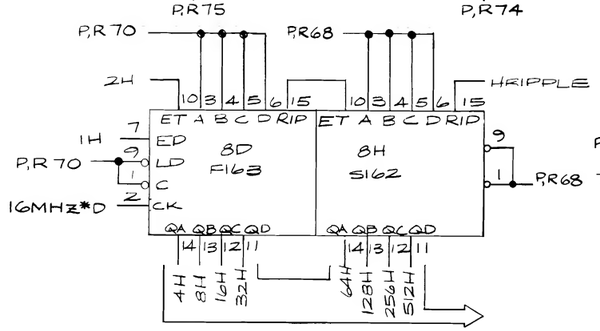


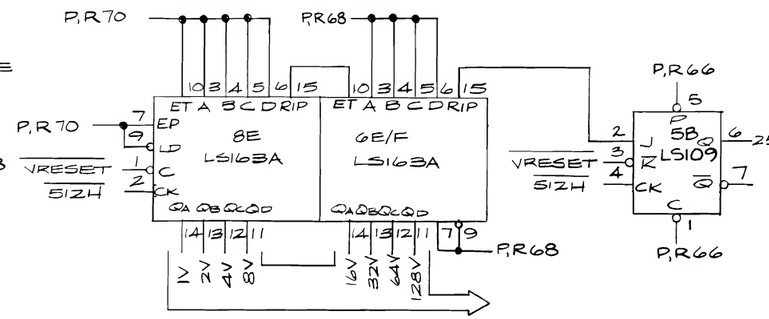


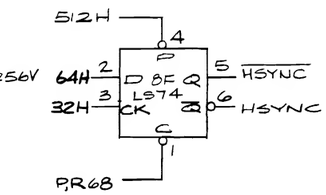
Sync Chain and Timing Strobes

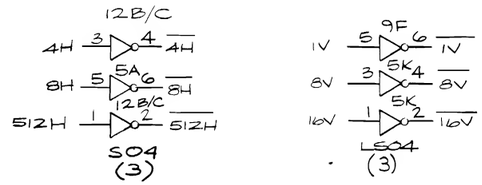


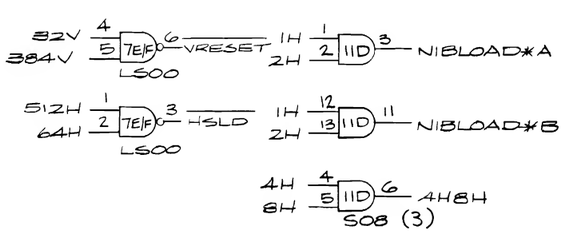


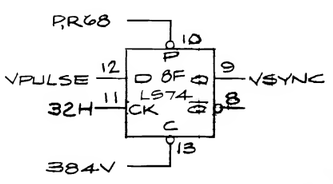


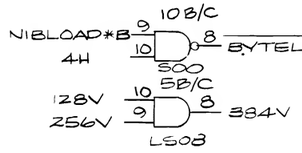


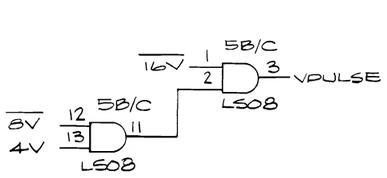


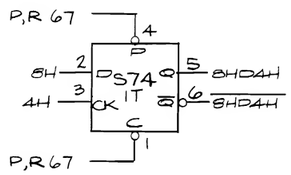


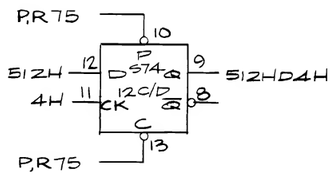


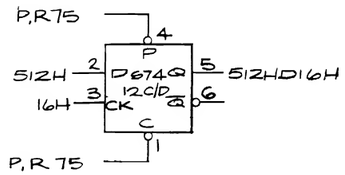


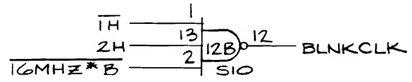


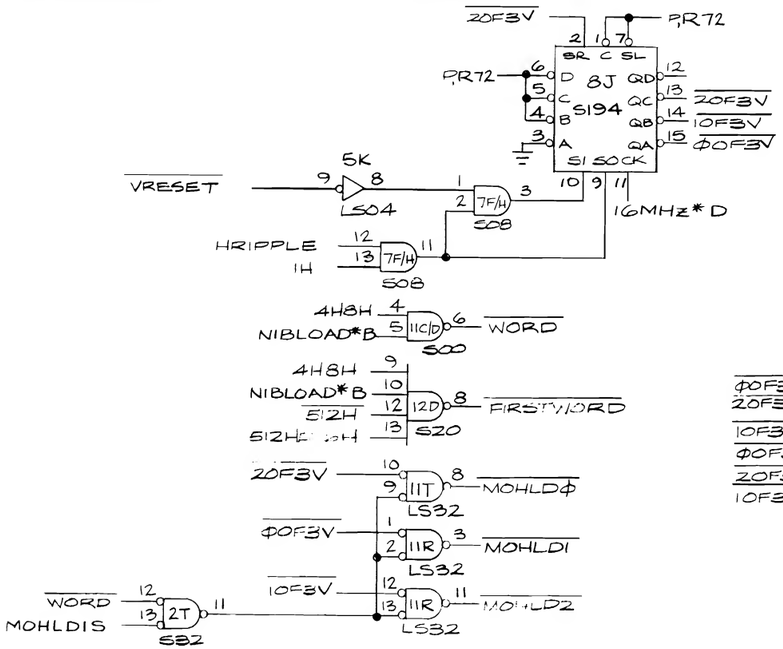


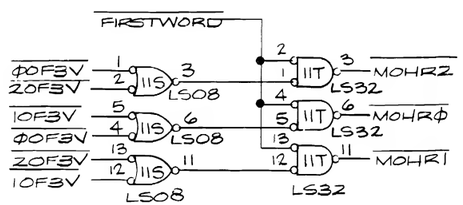












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ATARI GAMES

Super Sprint™ Video PCB Schematic Diagram

SP-290 Sheet 11A

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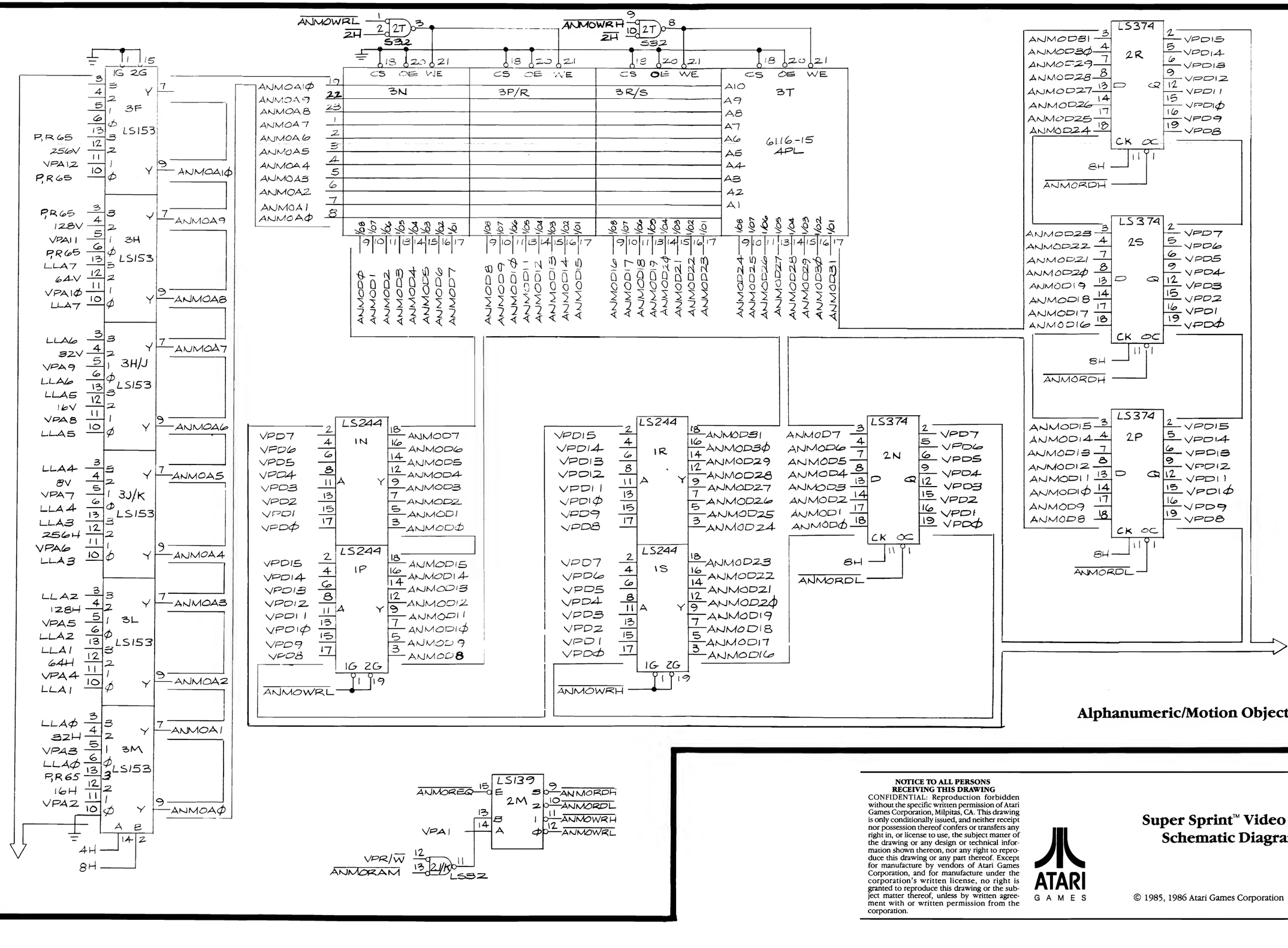

Alphanumeric/Motion Object RAM

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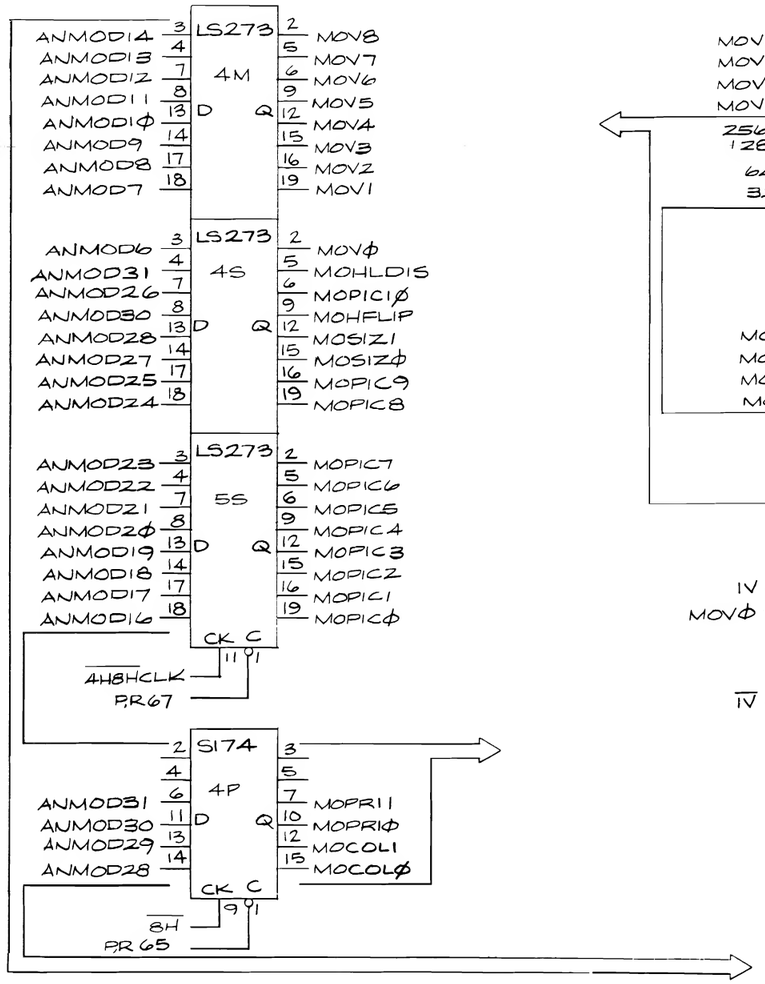
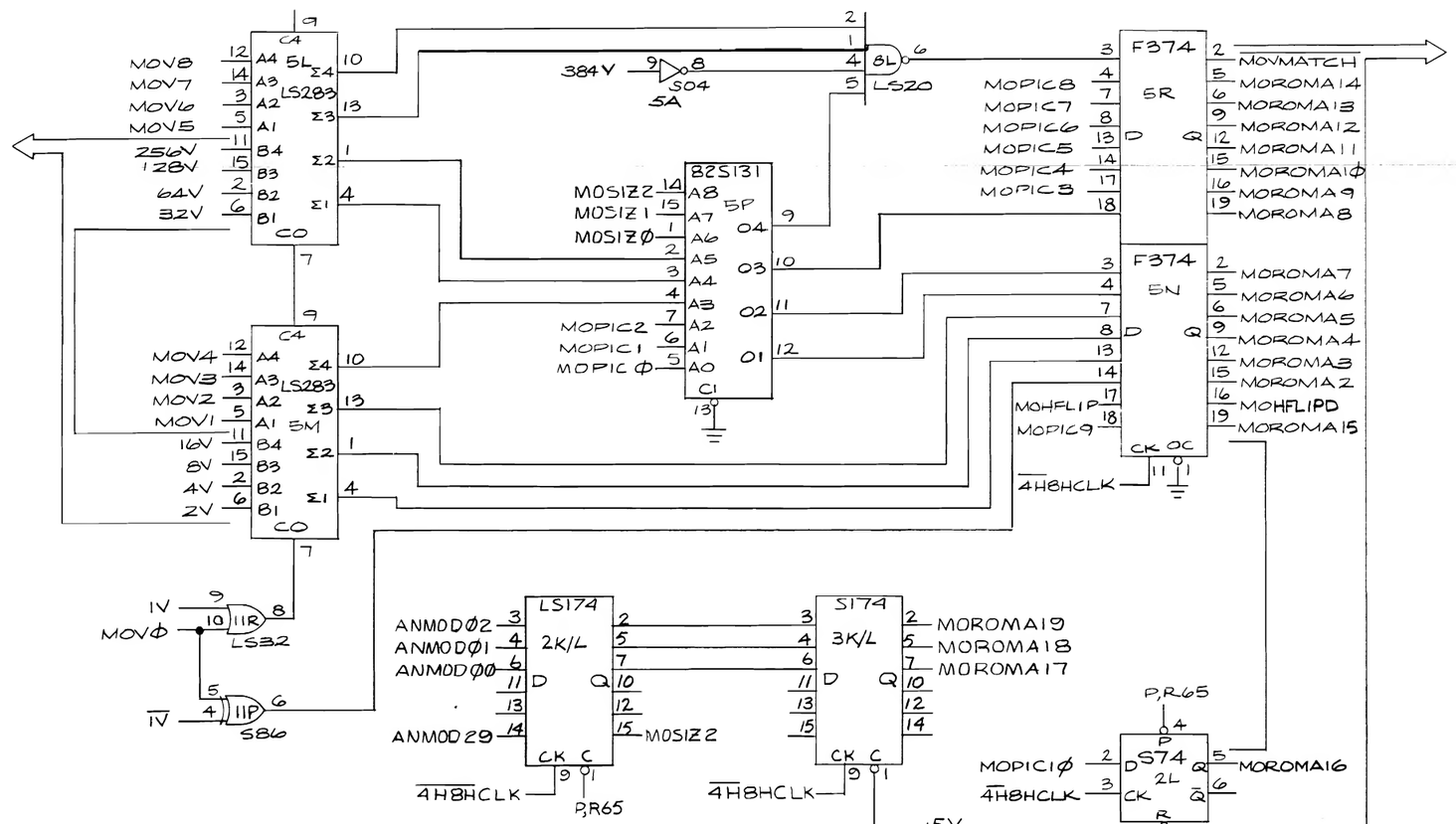
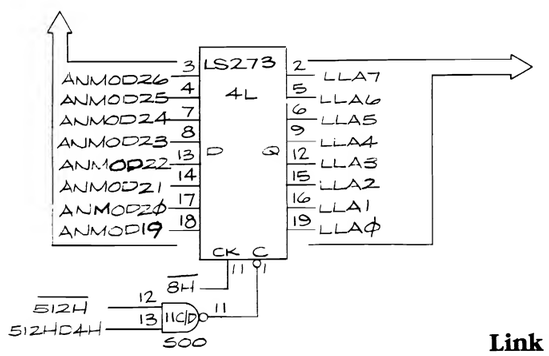




Motion Object ROM Addressing



Link List Address Latch

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Super Sprint™ Video PCB Schematic Diagram

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SP-290 Sheet 12A
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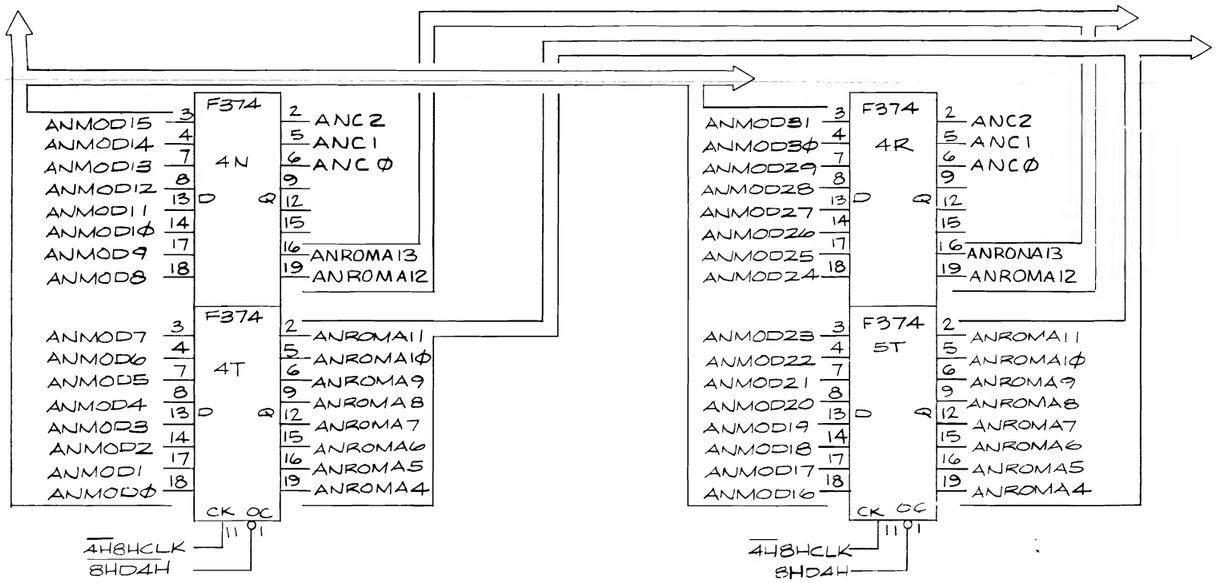
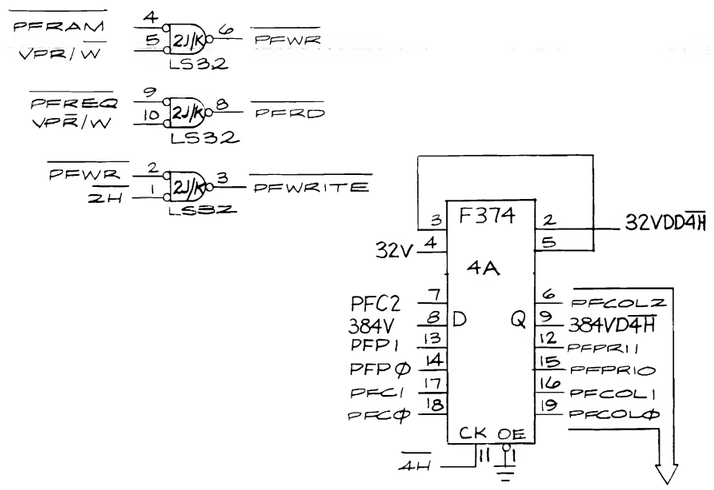
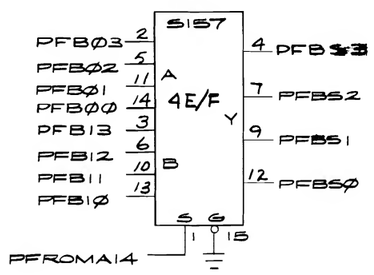
Alphanumeric ROM Addressing



Playfield Data Latch Strobes



Playfield Bank Select



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Super Sprint™ Video PCB
Schematic Diagram

SP-290 Sheet 12B

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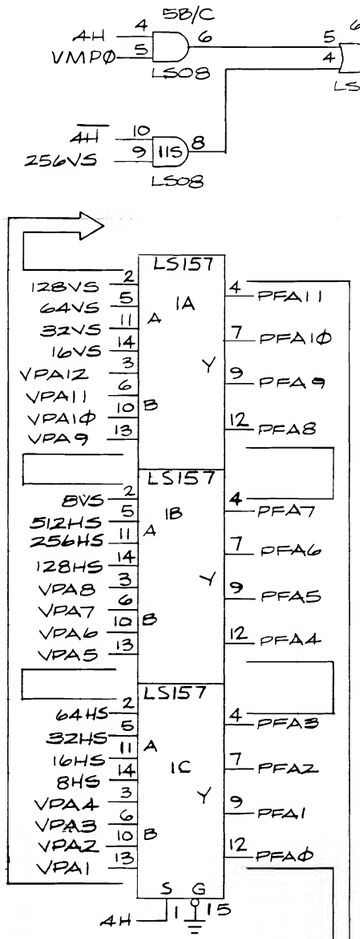
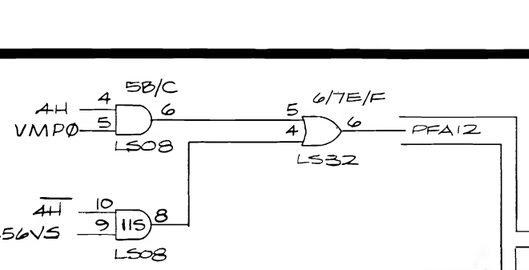
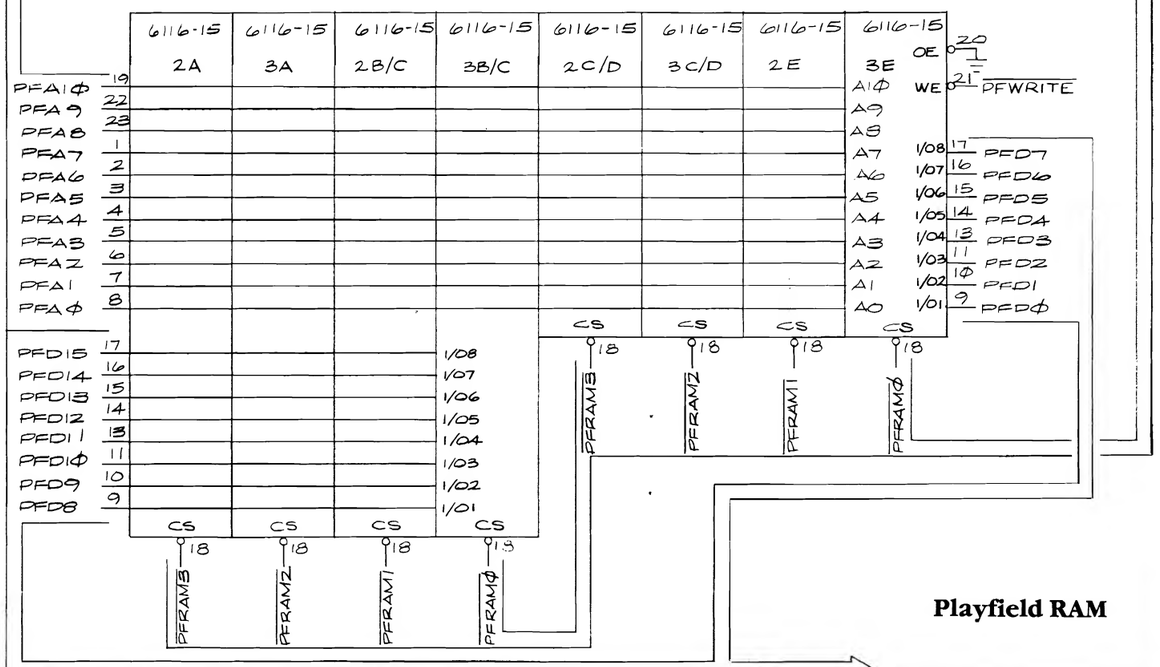
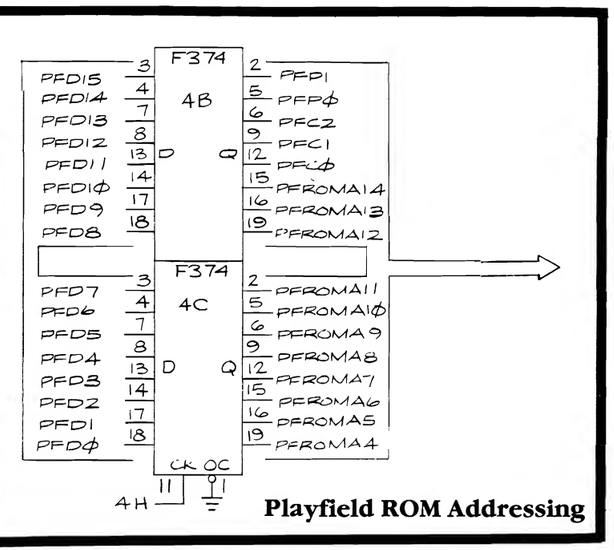
Playfield RAM Addressing



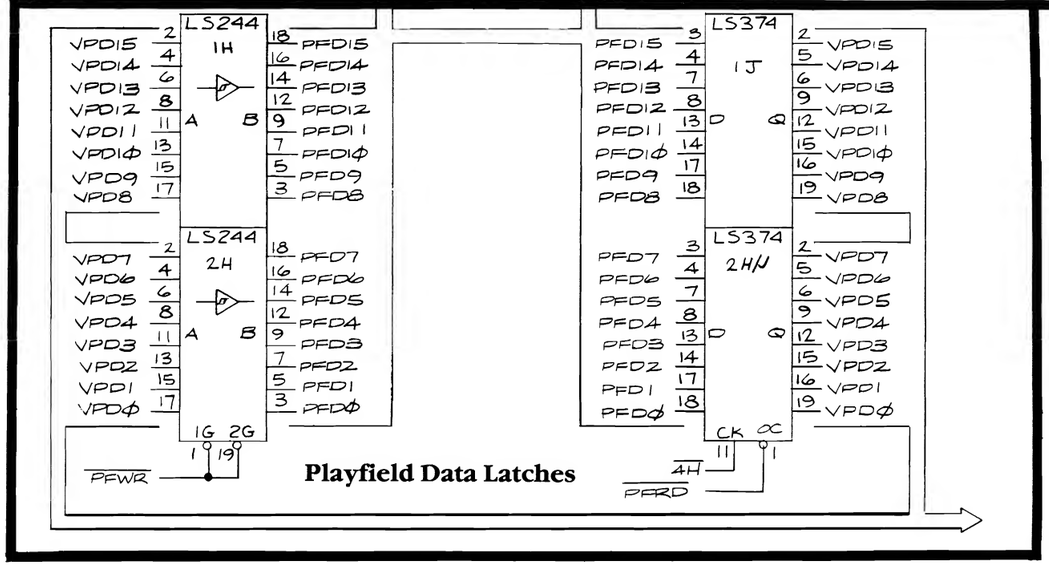




Playfield RAM



Playfield ROM Addressing



Playfield Data Latches

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Super Sprint™ Video PCB
Schematic Diagram

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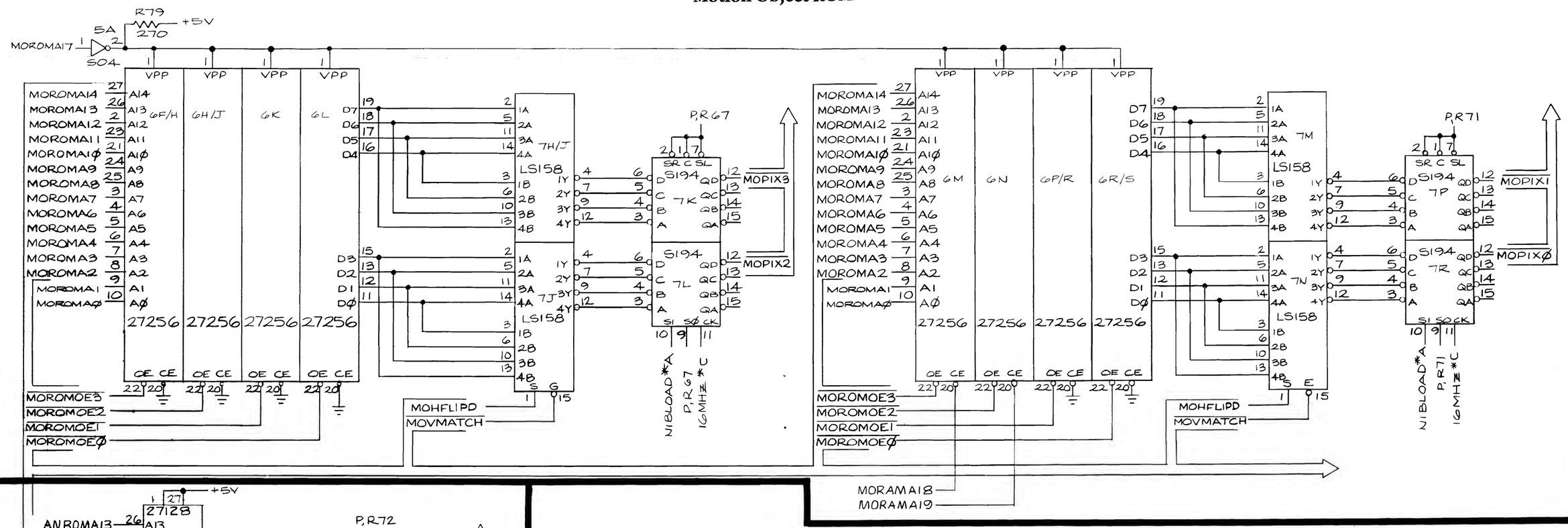
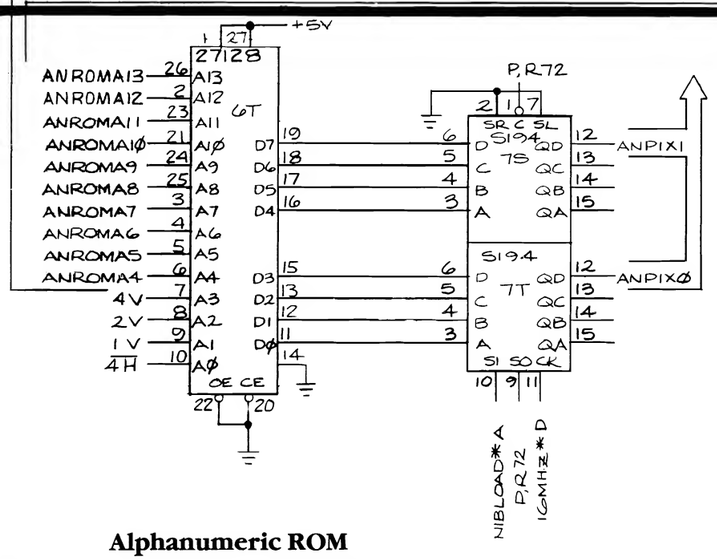
Motion Object ROM





Alphanumeric ROM

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Super Sprint™ Video PCB
Schematic Diagram

SP-290 Sheet 13B

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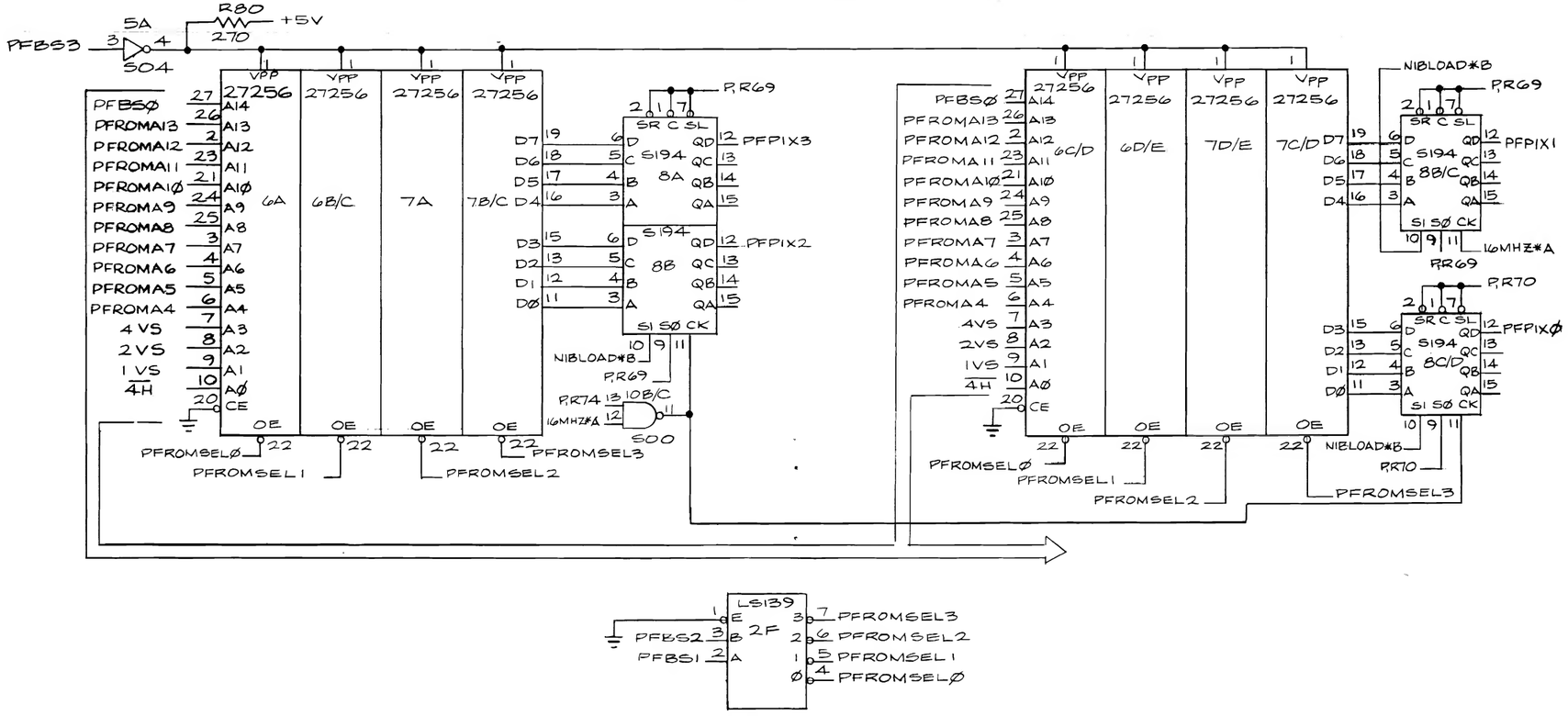
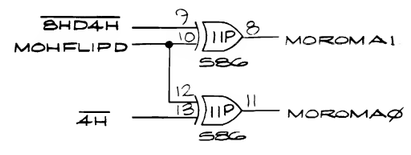
Playfield ROM





Motion Object ROM Addressing

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Super Sprint™ Video PCB Schematic Diagram

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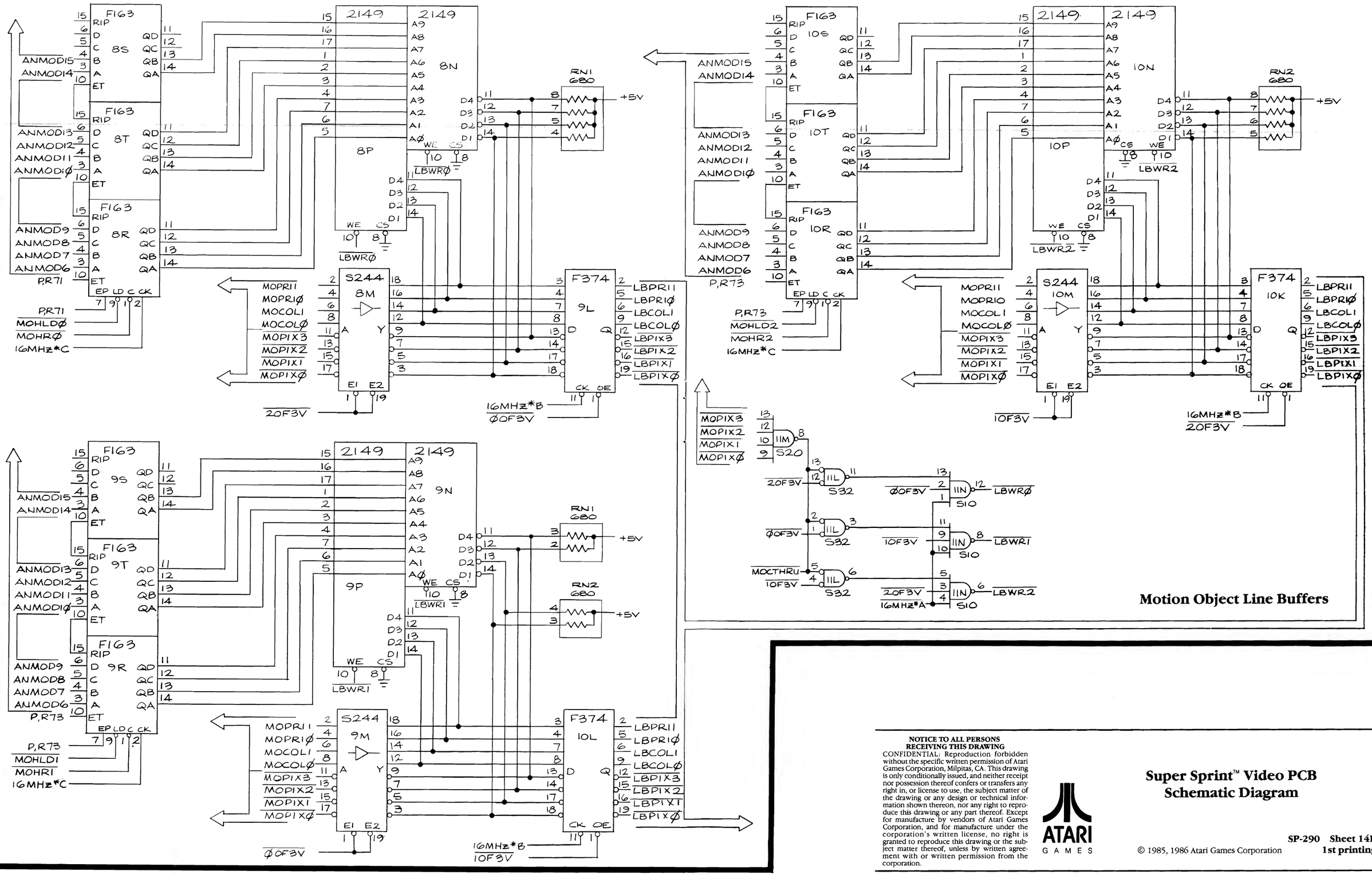

Motion Object Line Buffers

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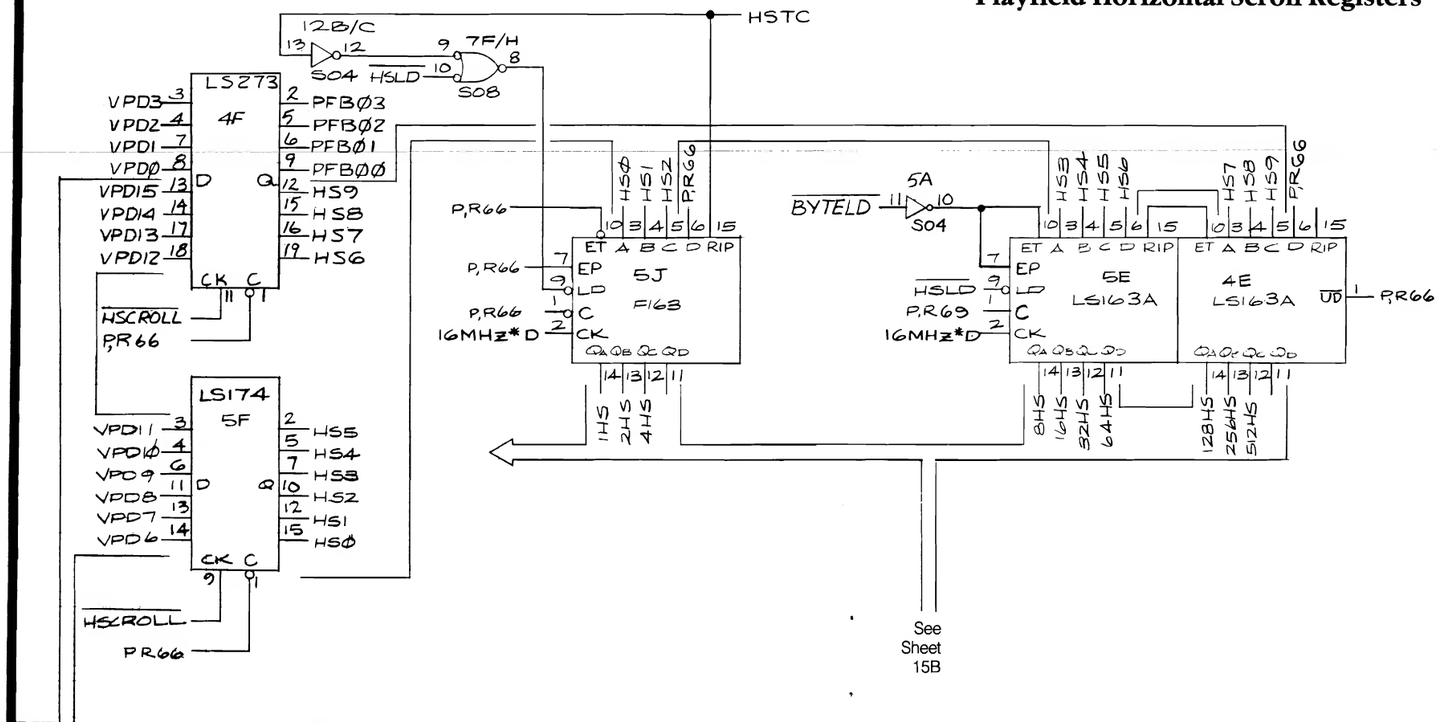
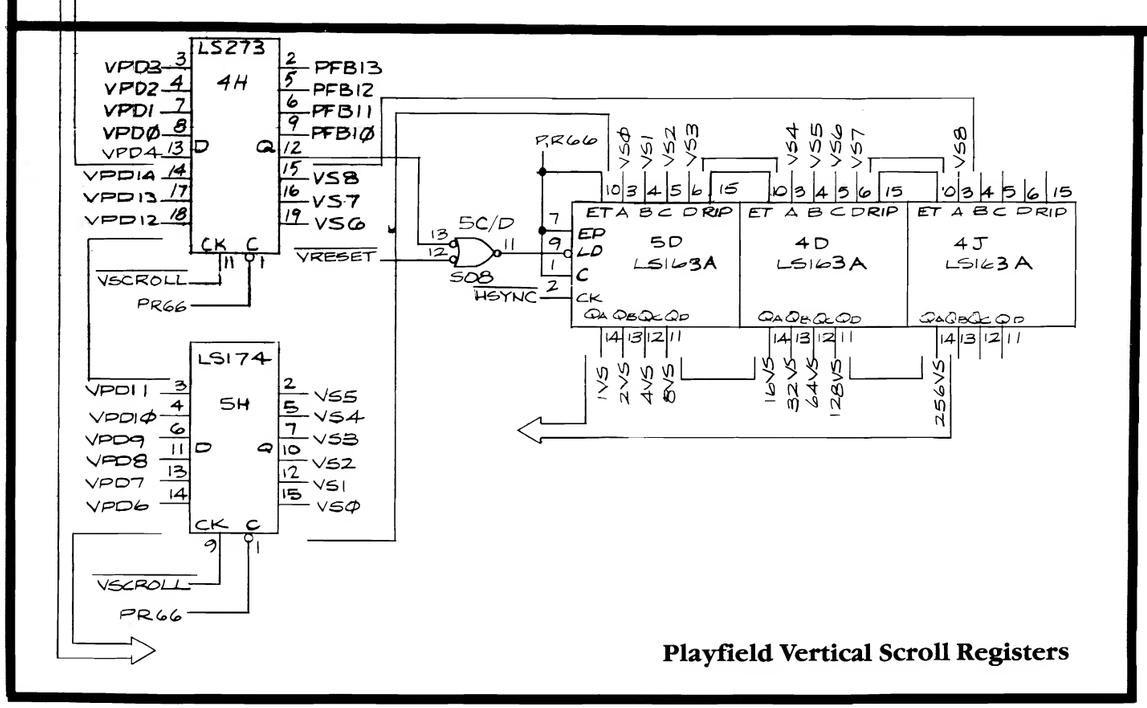
Playfield Horizontal Scroll Registers





Playfield Vertical Scroll Registers

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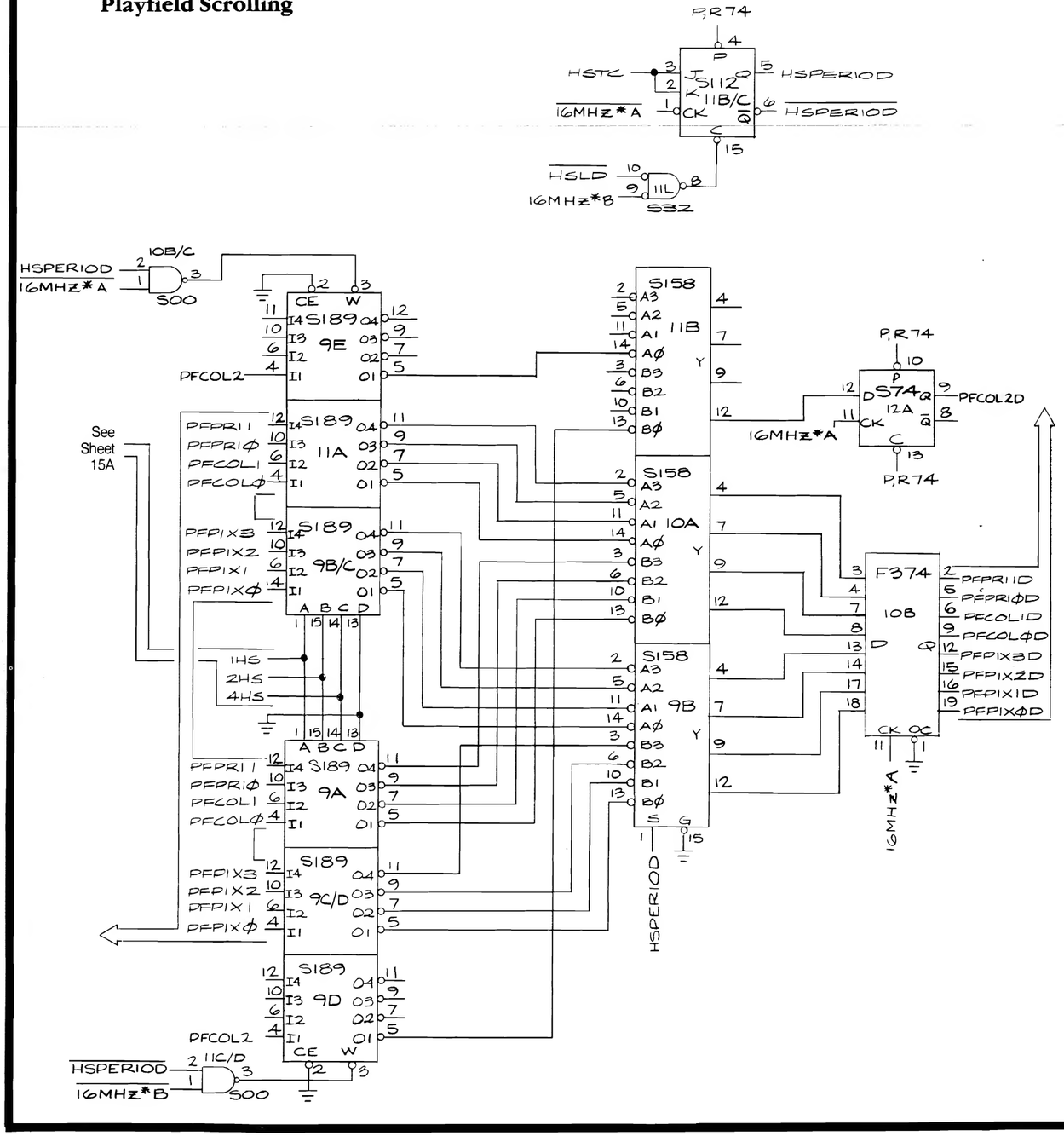
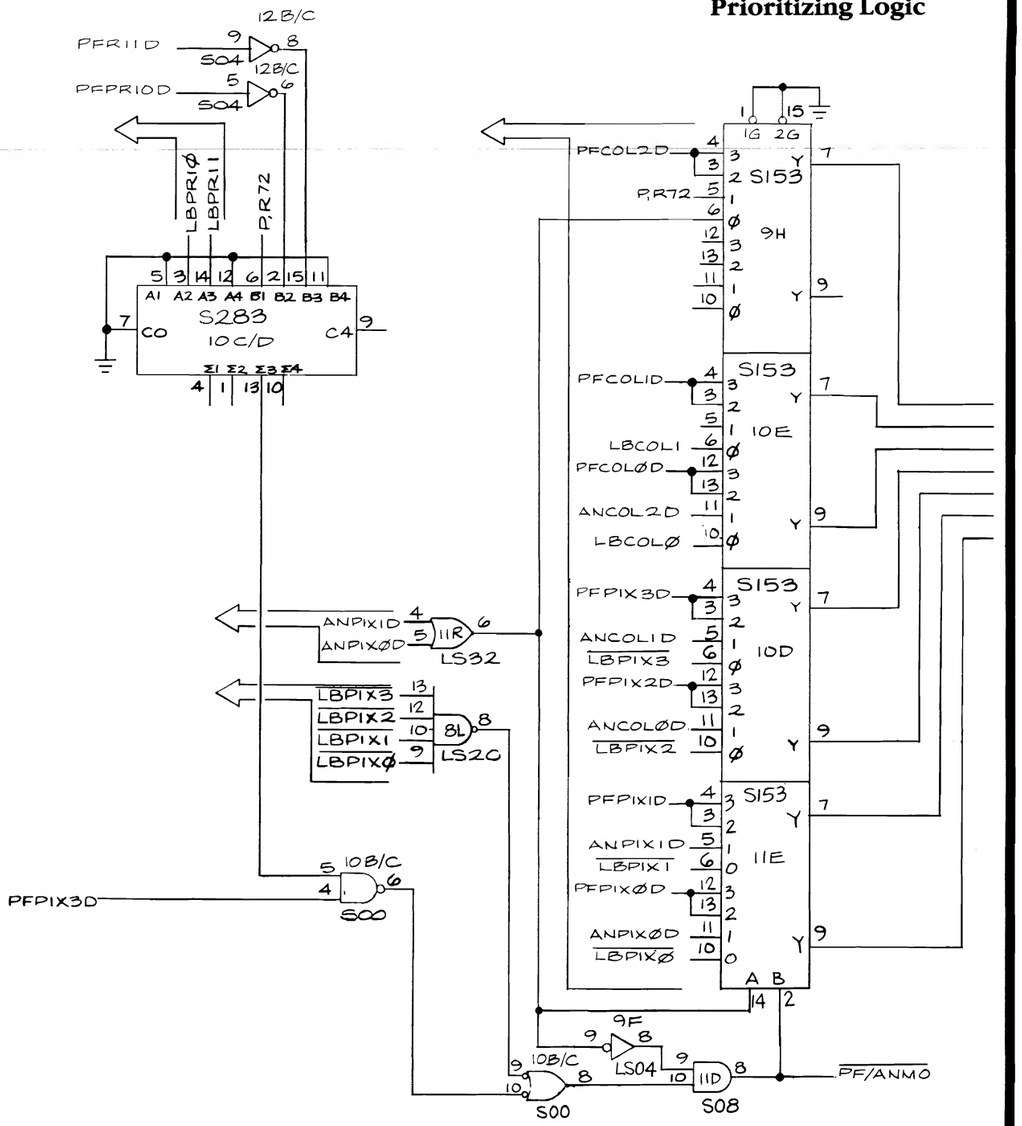
Playfield Scrolling



Prioritizing Logic



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Super Sprint™ Video PCB Schematic Diagram

SP-290 Sheet 15B

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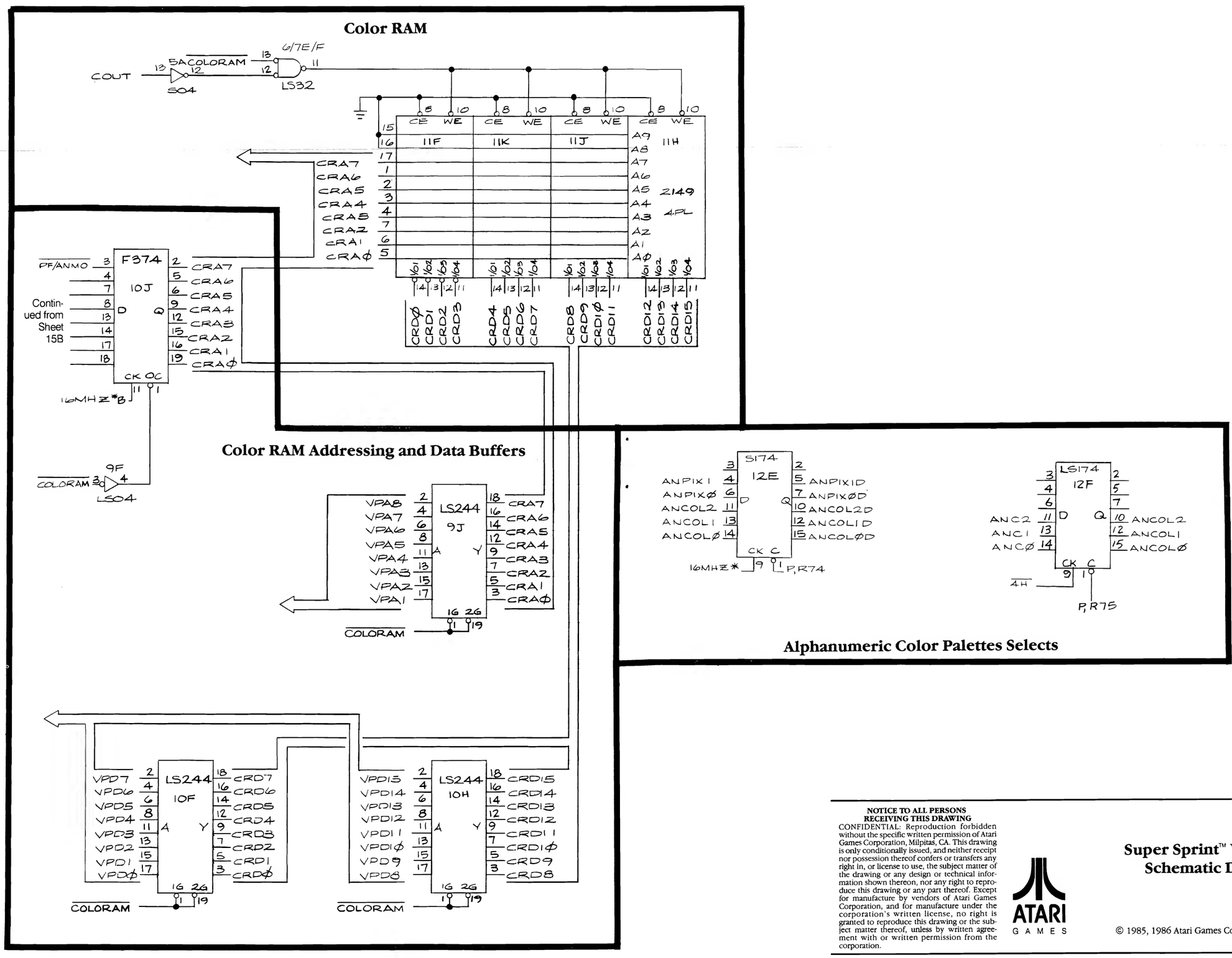
Color RAM



Color RAM Addressing and Data Buffers

Alphanumeric Color Palettes Selects

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Super Sprint™ Video PCB
Schematic Diagram

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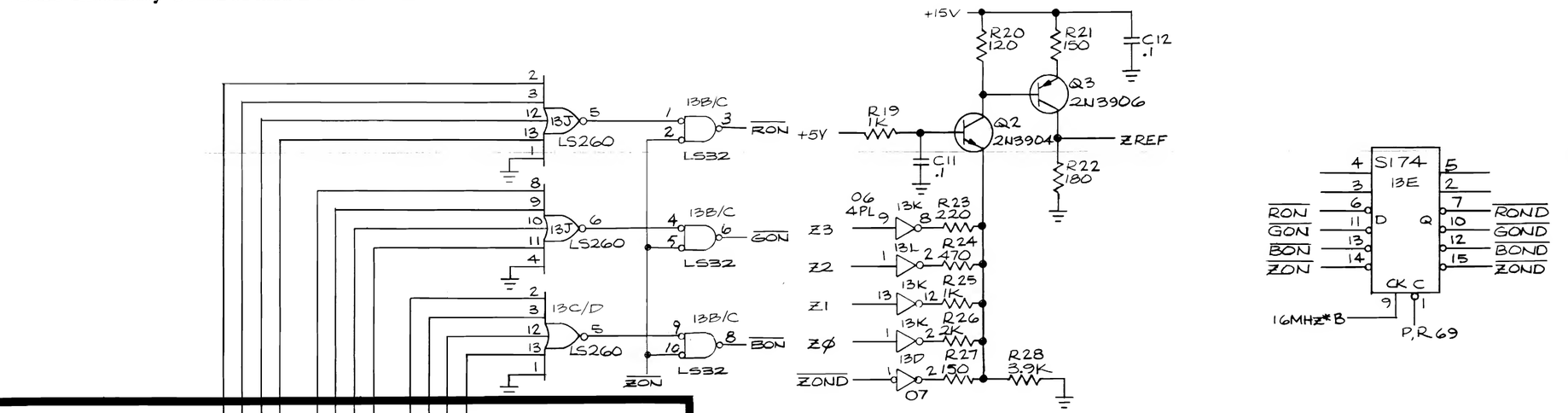
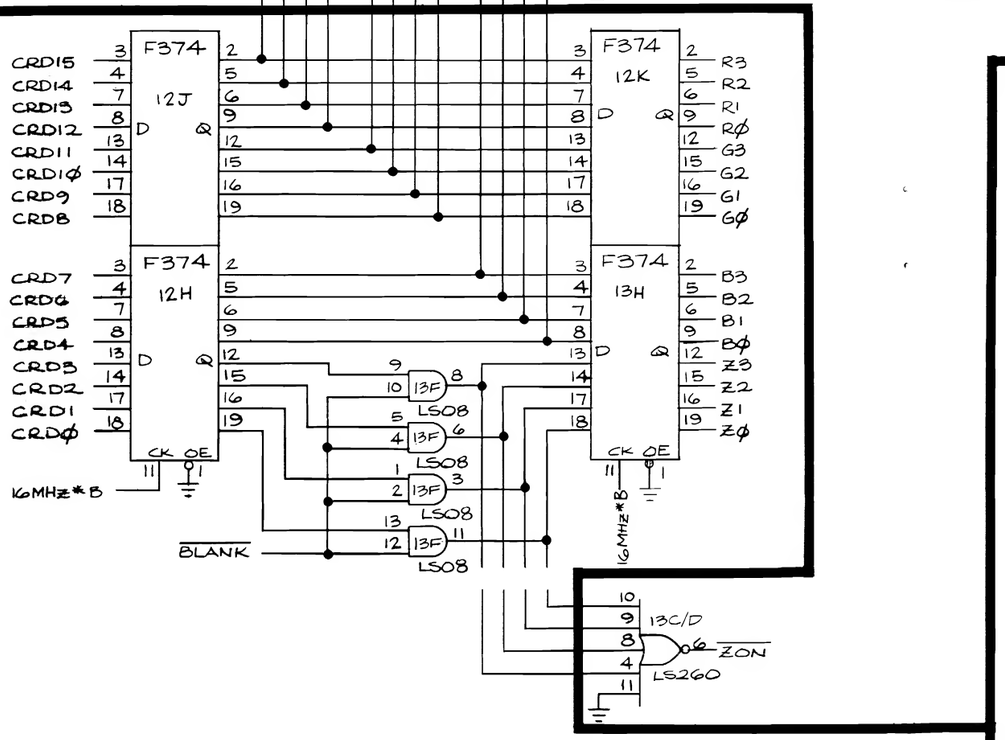
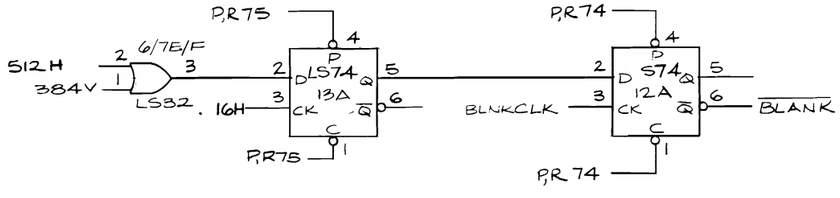
Video Intensity Control and Driver Enables







Data Latches and Blanking

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Super Sprint™ Video PCB Schematic Diagram

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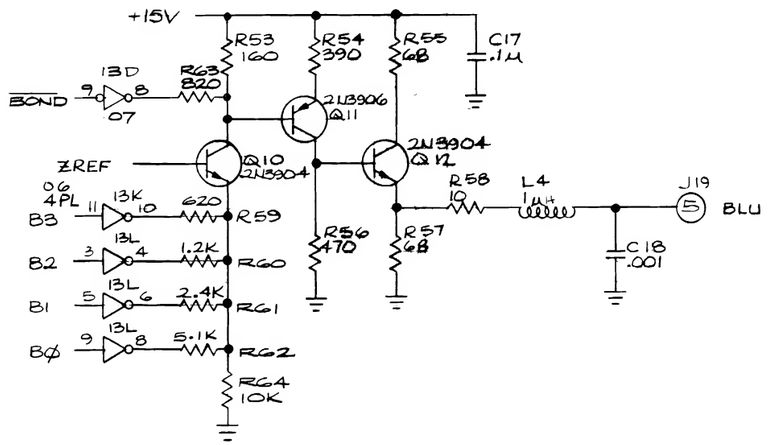
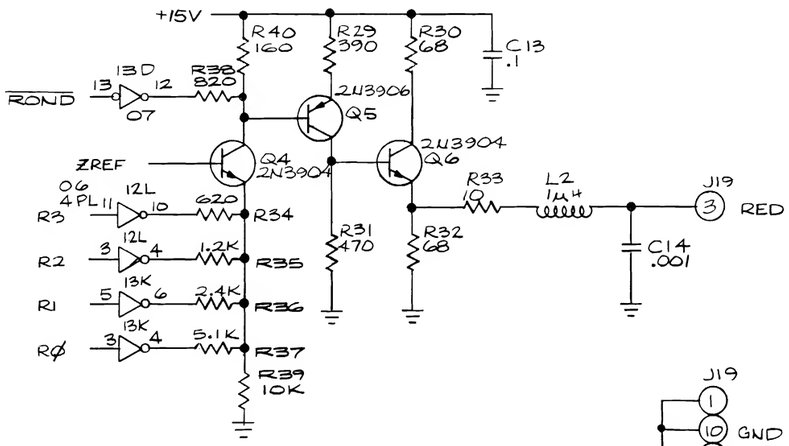
Output Drivers





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Schematic Diagram

SP-290 Sheet 17A

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